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SCLEROMALACIA*

REPORT OF A CASE

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The sclera consists of a dense, firmly knit capsule of interwoven meridional and equatorial fibers of connective tissue. Its vascular and lymphatic supplies are extremely limited. These factors, together with the sparseness of nerve terminals, both render the structure ideally protected against the invasion of microörganisms and leave it peculiarly defenseless to repel infection or to combat influences making for degeneration.

The pathology of the sclera is briefly told. When scleritis, episcleritis, staphyloma, and penetrating injuries together with certain cysts and tumors have been considered, the story is nearly complete. Parsons[1] added the more rarely encountered tubercle, leprosy, annular scleritis, and fatty and hyaline degeneration.

Scleral therapeutics are even more quickly disposed of. Hazy references to rheumatism, gout, lues, and gonorrhea give but slight encouragement in a search for the etiological factors in diseases of this structure. Thus the therapeutics and the pathology of the sclera provide one of the shortest chapters in textbooks on ophthalmology.

Rather recently Van der Hoeve[2] reported several cases of scleral disease under the title "Scleromalacia perforans" which fall under a classification Rochat[3] previously termed "Scleritis necroticans." Van der Hoeve made the suggestion that these cases may be more frequent than is commonly suspected, and emphasized their probably definite connection with the severe polyarthritis present in the same patients.

The following case, to be briefly described, is one of interest as further emphasizing this connection. It is unusual in that it falls into none of the known classifications of scleral diseases and varies in certain particulars from Van der Hoeve's cases of perforation. Nothing resembling it can be discovered in literature, nor has any similar case been encountered in the experience of several distinguished confrères who have examined the patient.

Since it is evidently a case of degeneration of the sclera, the name scleromalacia (following Professor Van der Hoeve's nomenclature) seems most appropriate.

CASE REPORT

The patient, a woman, is now 64 years old. She has been a victim of rheumatism since the age of 21 years. Taking to her bed nine years ago by reason of a fractured hip, she has been there continuously ever since because of a deforming polyarthritis. Practically all the joints are affected. Her hands are gnarled, her feet

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less so. Her spine is nearly rigid. There is some movement of the knees, elbows, and shoulders, and she can stand and even take a few steps if aided. Tophi are present in several joints.

My acquaintance with her began seven years ago when I was called in to pass upon the advisability of enucleating one eye, as counselled by a general practitioner.

At that time both eyes showed similar changes, more marked in the left. The first glance seemed to reveal a huge anterior staphyloma, although a moment's examination showed the fallacy of this observation, for all bulbar measurements were normal. The unusual appearance was due to the color of the sclera, which had lost its normal whiteness and looked slaty gray. At a distance the sclera resembled the cornea with gray iris behind it. The conjunctiva appeared intact. The episcleral tissue throughout, after a stage of edematous swelling, has with gradually receding margin been completely absorbed.

"Vitrification" of the sclera was the term that came to my mind at that time, and that perhaps best describes an eye whose thinning walls are translucent, allowing the choroid to show through. This vitrification has gradually extended farther back, more rapidly in the superior than in the inferior quadrants, until today the change involves each eye, at least to the equator—how much farther there is no means of determining.

When seen first the cornea and the other media were clear and permitted satisfactory intraocular examination. Such examination revealed no abnormality of the fundus. Tension has never been elevated. As the years have passed other signs of degeneration have occurred—both lenses are now cataractous and both eyes, except for light perception, are sightless. The left cornea has in recent years shown generalized clouding and roughening, but without ulceration. I suspect that a uveitis has existed but it has been so insidious as to cause no symptoms. A rather recent development is the occurrence in each iris of multiple radiating perforations, two or three in line, each perforation 1-3 mm. by 1 mm. in size, such radiating lines separated by distances of three or four millimeters around each iris. These perforations appear to be ruptures through the thin, atrophic iris.

Figs. 1 and 2 (Kiehle). Scleromalacia with arthritis. Showing the gnarled extremities.

At no time has pain been an important feature of the case. Such discomfort as the patient has suffered was described rather as "burning" and "irritation." As to the inception of eye symptoms, her recollection is that her trouble began with the common sensation of a foreign body in the eye. There is no history of trauma nor of previous iridocyclitis. The palpe-

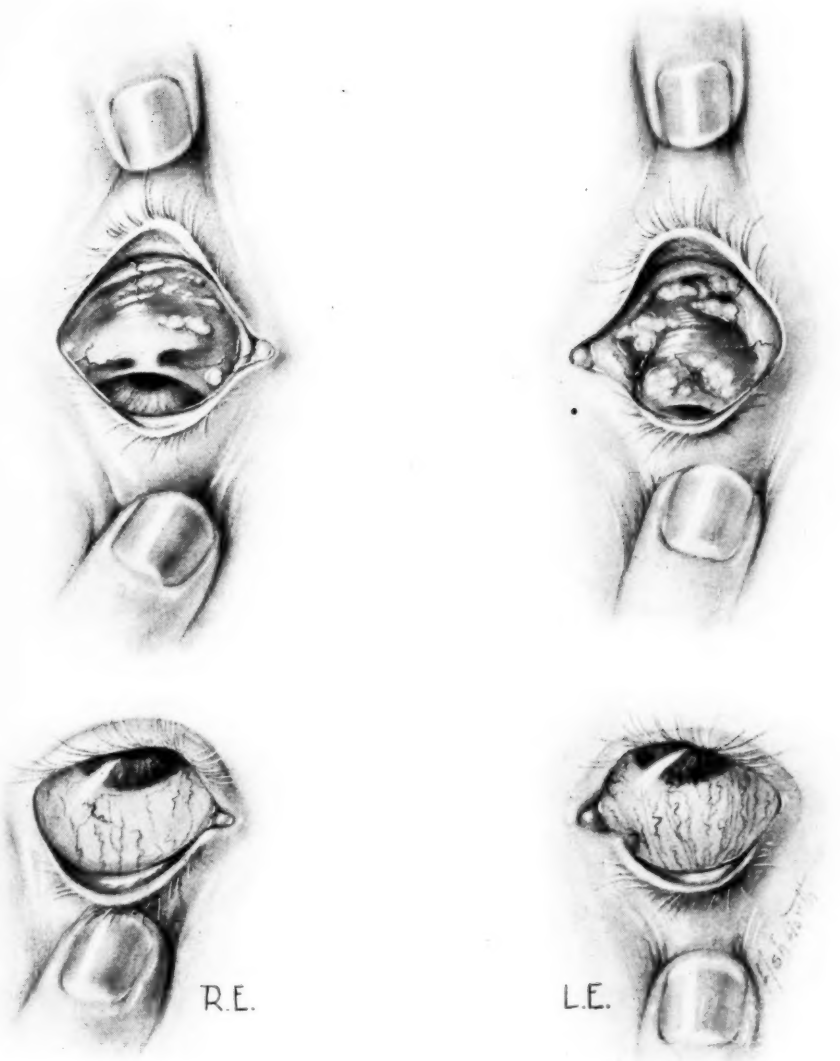

Fig. 3 (Kiehle). Scleromalacia. The condition in 1929.

bral conjunctiva appears normal, as do the lids and other adnexa. Bulbar movements are normal. Thorough general physical examination by a competent internist revealed no systemic disease apart from the chronic arthritis. Questions as to her customary diet suggested no vitamin deficiency.

In Van der Hoeve's cases there were multiple perforations though the sclera at or above the limbus, in approximately the 12-o'clock position, sometimes under an intact conjunctiva, sometimes opening through the conjunctiva. Careful examination with the loupe in this case revealed no area at which the sclera threatened to perforate. Observation under the slitlamp was impossible.

Fig. 4 (Kiehle). Scleromalacia. The condition in 1933.

Discussion

In the following particulars this case differs from those of Van der Hoeve: 1. There is no perforation nor evidence of threatening perforation of the sclera. 2. The episcleral tissue appears to have been absorbed, leaving no vestige of a limbus. 3. The multiple perforations of the iris are marked.

It is significant that all cases of this type involving degeneration of the sclera have occurred in patients suffering from arthritis deformans. A survey of the literature of this latter subject reveals the density of our ignorance as to its real nature and its cause. It is suggested that defective metabolism in the fibrous tissue and insufficient elimination of waste is a

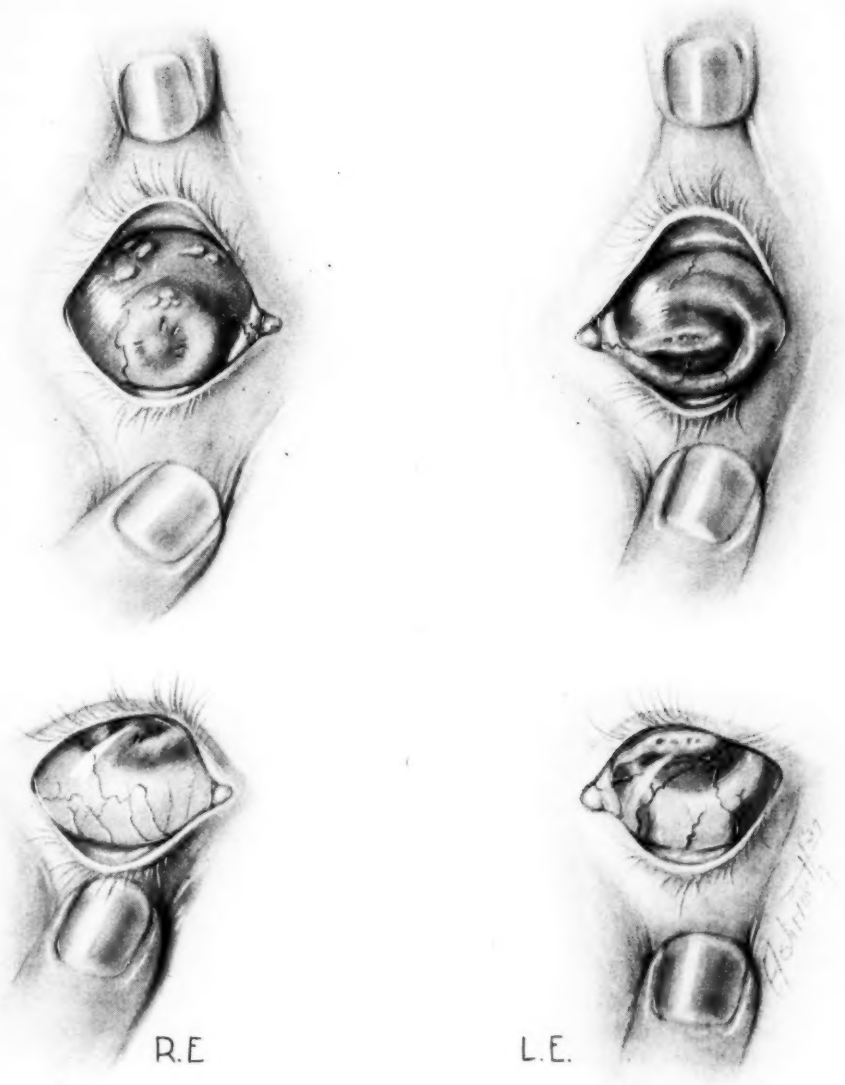

Fig. 5 (Kiehle). Scleromalacia. The condition in 1936.

possible basis of arthritis deformans. This may be a factor in scleromalacia. Friedenwald[4] stated that arthritis deformans is now regarded as a chronic infection. He, with a number of other writers quoted Osler[5]: "Arthritis deformans is regarded as a chronic infection caused by certain varieties of streptococci and secondary to a focus of infection somewhere."

The American Encyclopedia of Ophthalmology[6] says "Inflammation of the joints is properly associated with ocular changes," but makes no more definite statement and does not mention scleral involvement. Eber,[7] of St. Louis, in 1934 reported under the term "Fistula at limbus" a case of conjunctival bleb near the limbus and of over one year's duration, with a small opening through the sclera through which aqueous exuded. This pa-

tient had had rheumatic arthritis since childhood.

A recent exhaustive study[8] of the entire field of arthritis entitled "The present status of rheumatism and arthritis with review of the literature" makes no reference to ocular conditions nor to complications involving the eye. Knapp[9] in his "Medical ophthalmology" as well as certain other more recent workers[10] make no mention of arthritis deformans.

Friedenwald[11] said "the one thing that can be said with certainty about the etiology of these intraocular inflammatory troubles is that they must be in some way related to the etiology of certain forms of arthritis, for the association of these two conditions is far too frequent to be merely accidental."

One is therefore forced to the conclusion that we still have far to go in the study of the relationship between diseases of the sclera and severe joint inflammation. We must get what encouragement we can from such general statements as that of Adamson[12] that "The same poison may act on the individuality of tissue in different ways: just as champagne or port do, which in the one do no apparent harm, in another cause gout, in another headache, and so on. Thus might we expect the streptococci on a soil previously prepared by intestinal intoxication, to produce rheumatoid arthritis in one, osteoarthritis in another, or fibrositis in a third, and we can conceive that an antecedent focus of lesser resistance may determine an attack on different joints, one or many, the difference not being in the bacterial invasion, but in the physico-chemical state —can I say the electro-chemical state?— of the tissues." It is evident that the physiology of the joints merits much further study.

It is with the desire of making a contribution, however slight, to the solution of this problem of possible relationship between scleritis and arthritis that this report is offered.

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LECTURES ON GLAUCOMA

II. The operative treatment of glaucoma

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Dealing now with the question of the operative relief of tension, just as in cataract, no one method is suitable to all cases of glaucoma.

The actual type of operation selected frequently depends on special circumstances in the case, and when speaking of various methods of decompression, some of the factors which have been taken into account in making our choice of operation will be mentioned.

Various considerations influence our procedure in primary glaucoma. Two important local conditions are the stage of the disease and the type of the disease.

In early glaucoma, with relatively low tension and little or no change in the fields, if the patient is subject to congestive attacks and there is a distinct vascular-bed element, we perform a sclerocorneal trephining. If, however, the patient is in constant touch with skilled attention operation may be delayed pending thorough investigation and observation. Should prolonged observation be possible in nonvascular types we do not necessarily operate very early. But sclerocorneal trephining must not be delayed when there is a progressively depressing field, unless conservative treatment is indicated for general reasons.

High-tension eyes. When high tension is already well established the patient is kept under treatment for some time, and when a steady low-level tension prevails we operate by trephining. If we must operate on a high-tension eye, a lesser decompression is performed first; for instance, anterior sclerotomy or paracentesis.

In cases of anterior-segment origin we operate by sclerocorneal trephining. If not effective it may be repeated or augmented by other methods.

In cases of posterior-segment origin, the procedure depends on the stage of the disease. If very advanced, an anterior-segment decompression may be useless, but cyclodialysis may help. We perform trephining in the early stages in the hope that the cause at work may not be progressive and continuous or that the effects of pressure may be slowed up. Several anterior decompressions may help to prolong the usefulness of an eye.

Procedures

Sclerocorneal trephining we regard as the method of choice in straightforward cases of primary glaucoma when a free escape of fluid into the subconjunctiva is considered essential. Our technique differs possibly in a few respects from that of others. We try to avoid an abrupt thin bleb, and to this end we have for a number of years made a practice of splitting our flap into two layers, allowing the deep flap of subconjunctival areolar tissue to fall down in front of the trephine hole and taking up only the superficial layer of the flap in our stitch. It seems to us that this has given rise to a greater number of low well-covered cushions of filtration with good lateral extensions. The actual incision in the conjunctiva is relatively short, concentric with the limbus and about 6 or 7 mm. from it. It may be more. If so, when taking up the deep layer it is important not to wound the rectus insertion, since bleeding results. The flap having been fashioned, it is controlled with a koochie-wool swab wound on a

thin stick dampened with adrenalin or antivenin. When raising the flap, bleeding from large perforating vessels or others is stopped by the gentlest touch of a fine electrocautery.

Splitting the cornea in the literal sense of the term is seldom done. In the majority of cases a careful dissection of the subconjunctival flap with sharp scissors to its vanishing point reveals a sufficient underlying chamber. Sometimes a few light touches with the side of a needle are necessary. A minimum of trauma is desirable. The deep flap is sometimes buttonholed, but this does not defeat its main object.

The actual size of the aperture we vary. Sometimes a 2-mm. trephine is used and the whole disc is cut away. Of late we have practically discarded the Elliot trephine and are more and more inclined to use Green's mechanical trephine 2 mm. or 1½ mm. This allows plenty of room for elasticity in the magnitude of our sclerotomy or sclerectomy. One can make twin apertures, varying the distance between, and divide the bridge between or, if necessary, cut away a strip of the bridge.

Method of dealing with the iris. We prefer not to withdraw the iris into the trephine hole. On the contrary, when the iris bulges the bulge is snipped and a tiny buttonhole thereby formed, negative pressure is established, and the iris allowed to fall back. We aim at keeping the trephine hole free of iris tissue.

Here again we must use judgment in each case. Sometimes the iris is adherent to our disc. Both are cut away together. The iris may give us a distinct indication that it will become incarcerated; here a good aperture is made either by freely cutting away the iris hernia or even withdrawing a little more and cutting; or should we perform a twin trephining and divide the bridge, a curvilinear iridotomy concentric with the limbus or a complete iridectomy may be made. It can be readily appreciated that a decompression of almost any degree can be carried out in this way and it is a matter of judgment as to the extent to which one decompresses with the aid of a trephine.

One appreciates the ideas underlying Herbert's various modifications of producing decompression, somewhat confusing, perhaps, when one reads of the different types of flap which he designed, but allowing a range of elasticity not provided for by Elliot's more restricted operation. It is seldom wise to adhere rigidly to one operative technique, and to confine oneself to the method which Elliot advocated is in our opinion, after greater experience, a mistake. Decompression resolves itself into achieving an effective aperture preferably free from uvea by some method which will provide a safe leakage subsequently with the least possible trauma at the time. All methods, therefore, which aim at making an opening into the anterior chamber and removing a portion of the globe itself, with a view to allowing the fluid contents to gain access to the areolar tissue of the subconjunctiva, over a wide area, are really the same in the essential feature; namely, the decompression of the anterior segment.

It may be said in connection with decompression that: (a) Very similar results may be obtained by any method including nonoperative treatment in very early and mild cases of glaucoma. (b) At the other extreme, in advanced high-tension primary glaucoma (and we see many of these), a large communicating aperture between the anterior chamber and subconjunctival tissue is most likely to effect the maximum relief. (c) A sclerocerneal trephining, if well performed, is a simple and relatively harmless procedure in early cases, and more likely to be complicated in later cases. If sure of our technique it is wise to decompress early.

Lagrange's decompression. This meth-

od is effective when properly carried out. *Technique:* It is often an advantage when performing a Lagrange to fashion the flap first. In eyes with thin friable conjunctiva and perilimbal adhesions this is certainly so. It is often desirable to employ other methods in cutting away the anterior lip of the deep wound than the classical one; for example, a straight scissors or a knife may at times be preferable if the lip is ill defined. It has certain advantages of location. To adopt this method would seem preferable if for some reason or other the upper quadrants are not available. Owing to the difficulty of getting a nice low even cushion of filtration after a trephining in the inferior quadrants and the greater exposure, we prefer to perform a lesser degree of decompression by the Lagrange technique or, if necessary, one in each quadrant. It sometimes happens that a decompression is advisable a relatively short time before a cataract operation. In such a case we prefer to use the Lagrange procedure down and out and down and in, rather than to produce fibrous-tissue changes and possibly adhesions in the neighborhood where we intend to make a bridge-flap section subsequently. Such fibrous tissue might, for instance, interfere with the fashioning of our bridge-flap, or compel us to make it of a certain pattern in order to avoid our deep aperture. More often still we give preference to the Lagrange type of decompression in aphakic eyes where tension has developed, but in intracapsular-cataract cases an iridotomy should not be performed.

Should it happen that sclerocorneal trephining has failed or become complicated and the upper quadrants are denied to us as clear fields for operation, a Lagrange is convenient as an additional method of attaining still further drainage. I have had occasion to perform four decompressions on a buphthalmic eye before the requisite degree of lowering of tension was obtained; in this case two trephinings above and two Lagranges below. In my experience it is more difficult to establish effective leakage in hydrophthalmic or buphthalmic eyes by ordinary methods of decompression than in other types of glaucoma; although being pure anterior-segment types at the commencement one would think them ideal for anterior-segment decompression before secondary changes had become established in zonule and vitreous, and vitreoid aqueous had formed.

Anterior sclerotomy is an exceptionally useful temporary method of decompression and occasionally is sufficient for our purpose as a permanent operative-relief measure. As a temporary method we frequently use it in advanced cases of primary glaucoma when we are not satisfied that the eye has been reduced to such a state of softness that it is wise to carry out a more extensive decompression, such as a sclerocorneal trephining. Having adopted miotics, adrenalin packs, purgation, and so on, and kept the patient under careful conditions of diet, and so forth, if the tension is persistently high an anterior sclerotomy with a Herbert knife is performed. This may be either above or below the horizontal diameter according to circumstances. It may result in permanent minor filtration areas on either side and thereafter the eye is more readily controlled and dealt with by a large decompression above.

Iridencleisis. We have tried iridencleisis according to the Holth technique, but have had more failures in hospital practice with this method than with sclerocorneal trephining. Although I spoke somewhat favorably of this procedure at the Oxford Congress in 1933, we have now practically given it up. It seems to depend very considerably on follow-up treatment, massage, and so on, which we are unable to give in Indian hospital practice. I have had occasional good results,

but to my mind it is not so satisfactory as are other methods in which a definite portion of sclera is removed. I do not say it may not be perfectly satisfactory in cases in which follow-up methods can be pursued effectively, but so can nonoperative treatment. Whatever method we adopt must afford a sufficient escape of fluid to keep the tension down. I know nothing better for this purpose than a fairly free aperture above.

. *Cyclodialysis.* One can hardly perhaps speak of cyclodialysis as a decompression method, but we shall consider it here. There are occasions on which we are inclined to employ cyclodialysis: when, for example, the anterior chamber is practically obliterated by encroachment from the posterior segment, and limbal decompression does not avail; or when one eye is blind, the field is very small (within the 5-degree circle), and the effect of a large decompression is feared; or when we cannot get the tension down sufficiently for a favorable trephining. Ordinarily we are not in favor of its use.

An easy technique is to use a Green 1½-mm. trephine 8 mm. back, to reach the proper line of cleavage.

The preparation of the high-tension eye for decompression. The object is to get the tension down to as near normal as possible before operation, and to keep it there for a time. In hospital practice we are satisfied with a day or so at such a level.

The methods used are frequent instillations of eserine, leeching, purging, adrenalin packs, and massage. In very high resistant cases, anterior sclerotomy, adrenalin injections, hypertonic saline intravenously, or aminoglaucosan may be useful.

Acute congestive glaucoma and chronic primary glaucoma of a vascular type; that is to say, with congestive crises. It will be observed that very little has been said about congestive types. The fact is they are in such a minority that the other side of the picture claims most of our attention with an exception that I shall refer to presently. In acute congestive primary glaucoma everything possible is done to lower the tension without operation and it is sometimes surprising how successful energetic measures may be.

Eserine is pushed as before, also leeches, purgation, and morphia. Adrenalin is used only if the patient is to be operated on, when the usual retrobulbar novocaine and adrenalin injection is given.

If the above methods fail, then hypertonic saline, 30-percent sodium chloride, may be used. In an average patient up to 50 c.c. is given intravenously. In our lightweight patients the solution given with a syringe very slowly, in one or two injections of 20 c.c., saves the trouble of rigging up an irrigation apparatus, and the smaller quantity may be effective.

In the last resort, when we have to decompress, I am not at all sure that the classical iridectomy is the one and only procedure. There are at least two others that are effective: anterior sclerotomy, and trephining using a 1½-mm. Green trephine with a minimum of trauma.

In at least one type of acute congestive glaucoma, namely, secondary glaucoma due to intumescent cataract, the best treatment is a broad iridectomy. Such cases are perhaps not very common with you. You may meet with them now in connection with the rapidly swelling dinitrophenol cataract. They are an every day occurrence with us and few types of glaucoma are so satisfactory. The eye that we see as a hard, acutely congested, excessively painful organ with an empty chamber and dilated pupil is, on the average, a quiet, painless eye 48 hours after a broad iridectomy. We prefer to accomplish this with a Herbert knife, feeling the way across, as it were, from puncture

to counterpuncture. Anesthesia must be perfect. Occasionally a flap is turned down before the section.

If the intumescent cataract has not already reached the stage of general liquefaction and become a morgagnian at the height of the glaucomatous process, it almost certainly will do so when the tension drops; thus a short time afterwards, probably within a fortnight or so, the lens may be removed readily. Sometimes these intumescent cataracts are not simple, straightforward, mechanical causes of the acute glaucoma. A second factor enters in; namely, iritis due to the irritation of cataractous lens products. Apparently the capsule allows a certain amount of the liquefying lens material to seep through and set up an iridocyclitis. When this is so, the response to iridectomy is not so uniformly good; but still it is the only reasonable method of treatment, and even these cases settle down fairly rapidly.

Posterior sclerotomy. This is seldom employed except possibly to relieve pain in a practically blind eye. Posterior decompression by multiple trephining in the neighborhood of the ora serrata without penetration of the uveal layer we have resorted to in cases in which the vitreous has already gained access to the anterior chamber; but this or multiple puncture is an inquiry on which I would prefer to say nothing at present. In any anterior decompression in which the vitreous gains access to the trephine hole, it is almost certain there will be a failure. For this reason we have suggested elsewhere that in trephining for congenital glaucoma the success or failure depends on the integrity of the capsule zonule diaphragm. If there is a normal aqueous in the anterior segment, there is every hope of success. If there is a fluid vitreous continuous through either a stretched, dehiscent, or torn zonule with the aqueous of the anterior segment, and if these two media are approaching each other in consistency, there is every likelihood of failure. Retinal-detachment experience has taught us that conditions are different as regards the posterior segment. Should we employ posterior sclerotomy we perform it by preference with a Zur Nedden needle and a syringe. Even with this spear-headed needle a fine preliminary puncture with a knife helps, but more delicate methods are required.

Complications following trephining

Buttonholing the flap at the time of operation. If this happens before the trephine disc is cut, extend the flap to one side and trephine away from the hole. If it occurs after the trephine disc is cut, carry the flap down over the cornea.

Depressing the disc into the anterior chamber. This accident ought not to occur; it does on occasions, especially with an inexperienced operator. The disc must be removed and the best way of doing this is by means of a fine iris repositor elbowed about 3 mm. from its tip.

Pass the bent tip through the trephine hole into the anterior chamber, hugging the cornea. On giving it a complete turn the disc comes out unless it has been completely severed. If so it should be located and removed with the same instrument.

Detachments of portions of the retinal pigment layer. It is not so uncommon to find that small portions of the retinal pigment layer detach and float off into the posterior chamber. They may adhere to the lens capsule or even set up synechiae, but without other irritative phenomena.

Damage to the lens, zonule, or ciliary body at the time of operation. There is not much to say about the two former except that they should not occur. They are less liable to occurrence if we make twin 1½-mm. trephine holes with a Green trephine. The same applies to damaging

the ciliary processes. The placing of a trephine hole relative to the cornea on the one hand and the cilary body on the other is all important and requires judgment and careful calculation. If too far forward, a thin bleb is more likely to result, if too far back damage to the ciliary body.

Slight hemorrhage into the posterior chamber is not a serious matter. It readily becomes absorbed, but in rare instances we may have a recurrence, just as in similar hemorrhages in cataract extraction.

More extensive hemorrhage may take the form of a pseudo-expulsive hemorrhage from the anterior segment. It is sometimes very terrifying and similar to the pseudo-expulsive hemorrhage after cataract extraction, to which we have referred. Such things are rare in my experience and they must be recognized before too serious a view of the case is taken.

Hemorrhage into the posterior segment is a much more serious condition. It is possibly more common in decompression than in cataract extraction.

Detachment of the choroid is uncommon in our experience as compared with the same complication after cataract. It is not very serious. The difficulty of observing choroidal detachment is greater than after a cataract extraction.

Detachment of the retina is apparently rare, but for many reasons it is not possible for us to get a fair estimation of the frequency of this and the previous complication.

Impaction of the iris in the trephine hole sometimes gives rise to a great deal of irritation in addition to blocking the escape of fluid. The iris forms a hernia, so that the trephine hole does not function by allowing free access of fluid. One would think that treatment similar to that described below, namely, undermining and cutting the hernia, would result in improvement, but these iris herniae are not always effectively dealt with in this way. A Lagrange operation below may sometimes be necessary in addition to freeing the impaction above. Should there be vitreous behind the iris hernia it is a much more serious matter, and local interference with the prolapse is undesirable; a Lagrange procedure below may be tried or a posterior sclerotomy.

Impaction of the zonule or (a severer degree) rupture of the zonule and impaction of the vitreous. Nothing apparently can be done for this serious complication unless an anterior decompression below, or a posterior sclerotomy affords some relief. It probably indicates that the posterior segment has rapidly increased in volume or/and that the trephine hole has been made too far back.

Impaction of the lens equator. It sometimes happens that the upper pole of the lens becomes dislocated forward towards the back of the trephine hole. Whether this is the result of increase in pressure in the posterior segment and an attempt on the part of the vitreous to escape by pushing the lens forward, or whether it is a postoperative accident is not always clear. Sometimes it occurs on the table, and then one must consider the same factors to be at work as in cataract extraction when we get dislocation of the lens. We have seen a fairly good eye result from such a condition subsequent to a removal of the lens, but it is a very serious complication. As a temporary measure, a Lagrange procedure below may be helpful pending a removal of the lens.

Mild iridocyclitis with pigment deposits on the anterior capsule. In our experience iridocyclitic reactions and pigment disturbances have practically disappeared with minimal traumatism of the iris. We no longer irrigate the chamber and seldom

introduce an instrument. I feel persuaded that allergy plays a part in such phenomena. We use atropine should there be evidence of uveal trouble, and always immediately after operation.

Encroachment of the posterior segment on the anterior segment. In glaucoma of the posterior-segment type, trephining may be ultimately defeated if the original cause of the trouble persists and the anterior segment is obliterated. This may also occur as an immediate postoperative complication.

(a) As an immediate or acute complication, the day after operation we find the chamber empty and the eye hard. There is no interference with the trephine aperture and the pupil is round. We assume an acute increase in volume of the posterior segment and consider several possibilities: 1. Engorgement of the vascular bed. 2. Hemorrhage either choroidal or vitreous. 3. An increase in the amount of tissue fluid secreted with interference to its accumulation in the chamber. 4. Some increase in volume of the actual vitreous gel.

We have for years suspected and hypothecated that under the altered physical conditions subsequent to a section or a decompression, the vitreous gel in certain physical states is capable of rapidly increasing its volume without one of the first three factors which I have mentioned coming in. I do not see how it can be determined whether one of these factors is at work without viewing the fundus, and this is often difficult or impossible.

If there is no apparent interference with the trephine hole, such as blockage by iris tissue, hernia of zonule, subluxation of lens, or the like, our inclination is to treat such cases as one would an acute glaucoma by pushing miotics, leeching, and purgation. If there is no improvement, intravenous hypertonic saline may be given. If nothing happens in spite of such efforts, our inclination would be to try a cyclodialysis. Sometimes eyes with an empty chamber and a big rise after decompression do come right, but on the whole the prognosis is bad with us because as a rule this only happens in cases which were desperate at the start. We hardly recognize such a thing as happening in even moderately advanced cases. It is rare, and as, of course, the material you have to deal with is infinitely earlier and better than ours, it ought to be rarer with you, unless you are dealing with a special type oftener than we are. I believe that you probably have to deal far more with vascular-bed types and the influence of the vascular mechanism than we do. The great bulk of our cases are undoubtedly of the vitreous-body type.

(b) Late encroachment is apparently due to a slow increase in volume of the vitreous body and although decompression may give relief at the beginning there comes a time when this is mechanically impossible, and the eye is gradually lost.

Hypotonus as a complication is rare with us.

Delayed formation of the anterior chamber. Apart from the empty chamber that is associated with increase in volume of the posterior segment, slow formation may be due to leakage or other obscure factors. As a rule, the chamber eventually forms in such cases with the use of dionin unless there is a definite complication at the trephine hole.

Limitation of the filtration area. A localized cystic elevation may form which appears to be shut off at its base by definite adhesions to the sclera. It may pit, but there is no pitting beyond its rim. This limited cyst may be bleblike or well covered and solid in appearance.

Treatment consists in undermining and dividing the edges where these adhere to

the sclera. *Detail of this procedure:* Balloon the conjunctiva with novocaine-adrenalin solution. Buttonhole the conjunctiva down to the sclera in the mid-superior temporal region about 4 mm. from the limbus with fine blunt-pointed scissors curved on the flat, and undermine with them towards the elevation, hugging the sclera. Cut the adhesion or rim of the cystic elevation to the sclera, being careful not to enter the trephine aperture, and continue undermining towards the nasal side for a short distance. This method has served us well for some years.

Complete sealing of the hole by fibrous tissue is not rare and results in a complete failure of our decompression after a certain time. In my experience this is very likely, for some reason, to happen with congenital-glaucoma cases. In such an event multiple decompression may have to be performed. Ordinarily careful postoperative treatment, especially massage, establishes the cushion of edema which then persists.

Cicatricial tissue and the flap. A flap made where a flap has been previously raised is more apt to have bad filtration; for example, trephining after a cataract extraction with a flap in the superior quadrant.

Cataract extraction under a bridge flap interfering with the filtration area. It does not always do so with a clean wide bridge. In fact I have known it to improve a filtration cushion, but obviously it may cause a generalized adhesion. Perhaps it is better to avoid the region of the hole and take our bridge flap to one side. In any case a complete iridectomy is advisable in such cases.

Immediate drop in the vision may occur for no very obvious reason, possibly on account of damage at the macula.

Immediate depression of the field is not to be overlooked and one must be careful in advising patients about operative treatment when the field is very small.

Cataract coming on rapidly after a trephining operation. Reference here is not to injury of the lens by the trephine and localized cataract, but to a rapid precipitation of the cataractous state, as it were, associated with the alteration in tension. This is one of the distressing features in high-tension eyes. It is not seldom that a patient has 6/6 vision before operation, and subsequent to the operation, in a fortnight or three weeks, there is no vision. It requires a good deal of faith on the part of the patient to continue with the same surgeon. If other things are favorable and the decompression has been a good one, in due course the lens may be removed, but it is hard to persuade the patient to remain. This complication is more likely to occur in patients who have been operated on late.

Late infection. One has heard a great deal about this since sclerocorneal trephining came into vogue. We have had, perhaps, greater experience of sclerocorneal trephining in Madras than any school in the world and I can say only that late infection after trephining does not appear to be any more frequent than after any of the intraocular operations. I would go further and say that late infection after cataract extraction is, in our opinion, more to be feared, and this too, in a class of patients normally exposed to all manner of infections of the conjunctiva. Possibly this may have something to do with the technique of the operation, the amount of traumatism, or the scantiness of the covering given to the cushion of fluid. However, the experience must be sufficient for the individual. If any operator finds that he gets more frequent late infections after trephining than he does after other methods of decompression, it is likely that

trephining in his hands and for his material is not the best method to employ.

Progressive field changes in spite of good filtration. The most distressing complication, if one might call it so, is to see a perfect sclerocorneal trephining return after five or six years, still effectively decompressed but with a steadily depressing field.

Postoperative treatment

Immediate. Many exponents lay great stress on free atropinization for some weeks. This in my experience is not so important if the operation has been free from undue intraocular trauma. Atropine must of course be used if there is an iritic reaction. We do not see nearly so many cases in which there is an inflammatory change in and near the pupil as we did some 10 years ago. Apart from iritic phenomena the question of a mydriatic or a miotic in the immediate postoperative treatment depends on the tension and the degree of fluid escape and distribution. If the tension is inclined to be low we use atropine, possibly dionin. If the tension is full normal or higher we use pilocarpine. If the fluid escape is poor or localized, massage is adopted early.

Massage and pilocarpine in the late postoperative period after trephining. The fact that massage and pilocarpine have been advised by some surgeons as a follow-up treatment after trephining shows that it is not always sufficient as a decompression method alone. The same is true of other decompression methods.

Early massage and atropine may help to establish a wider area of fluid distribution; this is a different matter and is good policy. I refer now to the necessity of continuing massage and miotics for prolonged periods. Unless this is associated with a steady obliteration of the anterior chamber, further anterior decompression is indicated.

Government Ophthalmic Hospital.

COMPLETE RETINAL DETACHMENT (BOTH EYES)

WITH SPECIAL REFERENCE TO ALLERGY AS A POSSIBLE PRIMARY ETIOLOGIC FACTOR

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That edema of the retina due to allergy may be the primary etiologic factor in an occasional case of detached retina is indicated by the following case:

Miss K. H., aged 21 years, developed eczema at three months of age. Asthma and hay fever appeared when she was about 12 months old. The asthma was very severe during the first seven or eight years of her life, but it has gradually become much less. Vasomotor rhinitis persisted during infancy and still persists. The eczema gradually grew more severe, and until the patient was about 16 years of age, the eruption was marked about the face and chest.

When 17 years of age, the patient first noticed disturbance of the vision in one eye. An ophthalmologist was consulted, and she was told that there was separation of the retina from an undetermined cause. On account of the disturbing ocular symptoms, which gradually became more severe in one eye and finally involved the other, her parents consulted a number of ophthalmologists. Each one reported that the condition was a progressively detaching retina, but that he was unable to suggest a causative factor. At the present time, the retina in both eyes is completely separated, and the patient is totally blind.

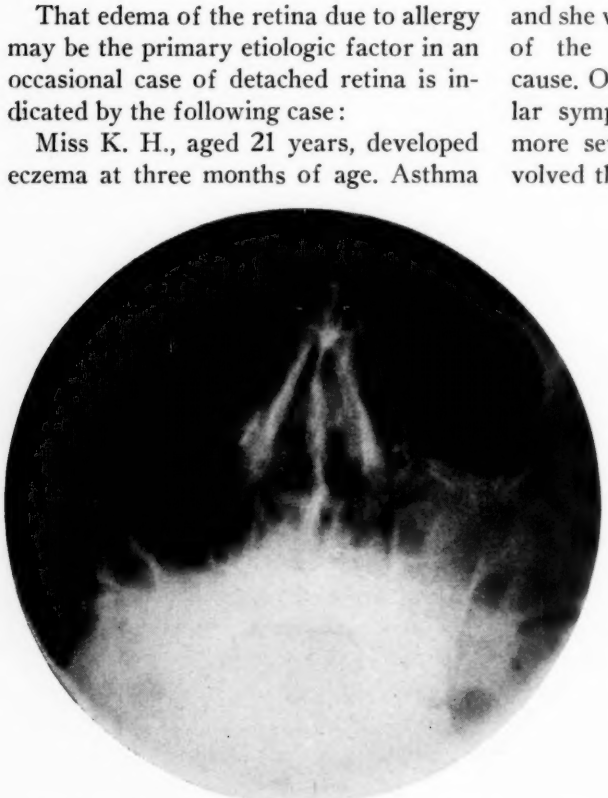

Fig. 1 (Balyeat). Showing calcified deposits in the retinae, vitreous, or lens.

In the X-ray plate, as shown in figure 1, can be seen calcified deposits which appear to be in the retinae, but are more likely in the vitreous or lens. Both lenses are opaque and, therefore, the exact location of the calcified area cannot be determined. It appears from the X-ray plate showing the lateral view of the right eye (fig. 2), that the calcified area is behind the lens. Note that the left antrum is cloudy. Careful investigation leads to the conclusion that the cloudiness is due to allergic edema and not to infection.

In testing this patient by the intradermal and patch methods, we found her sensitive to a number of foods and inhalants. The most important were the following allergens:

Silk, intradermal	++++
Silk, contact	++
Milk, intradermal	++++
Egg, intradermal	++
Wheat, intradermal	0

The patient stated that contact with silk cloth of any kind increased the severity of the skin symptoms. As we have talked with her from time to time, she expressed the belief that the inhalation of silk dust also increased her symptoms. On account of the extensive skin reactions, the question arose as to whether, at the time we saw her, the atopic bodies to the foods to which she was sensitive existed only in the skin or were also in the blood stream and continue to be important factors in the cause of her asthma, eczema, and hay fever. For this reason, leukopenic studies were carried out on a number of foods and are reported in the graph (fig. 3).

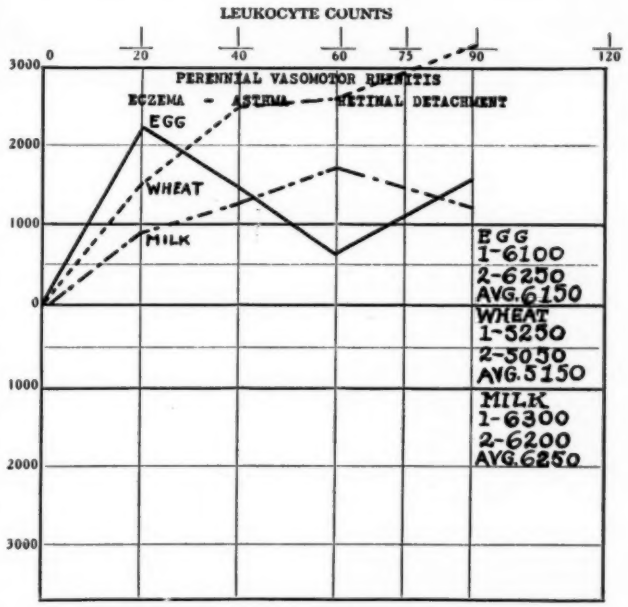

Fig. 3 (Balyeat). Negative leukopenic indices for wheat, egg, and milk.

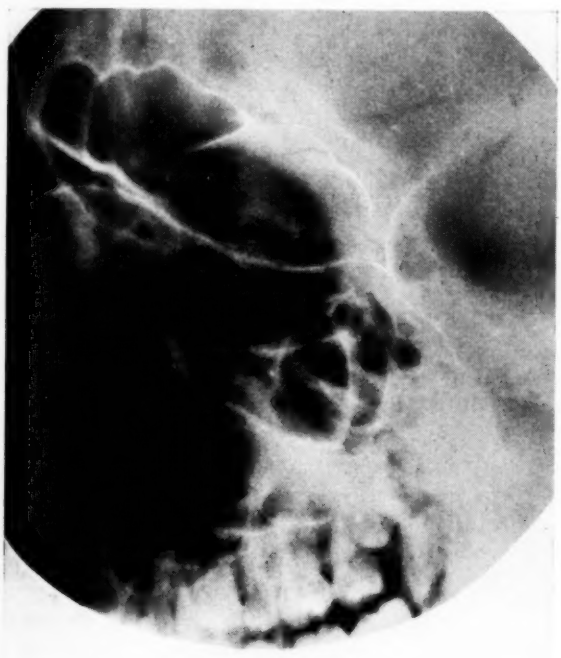

Fig. 2 (Balyeat). Lateral view of right eye. The calcified body appears to be behind the lens.

Discussion

The history of this patient is one of an asthma in early life, due to foods. She has gradually developed tolerance to the foods to which she was sensitive, and in consequence she suffers much less from asthma. In spite of the fact that the skin reaction to milk was four plus, the leukopenic index would indicate that milk was probably not causing asthma nor hay-fever symptoms. The omission of milk from her diet did not seem to change her nasal symptoms, the amount of mucus in the chest, nor the eczema from which she suffers. Attempts at desensitization with silk were associated with an increase in the hay-fever symptoms and in the eczema. Careful study leads us to believe that contact with, and inhalation of, silk have much to

do with the cause of the eczema and perennial vasomotor rhinitis.

The question as to the possibility of allergy as a cause of retinal detachment is an interesting one. The same embryological structure, namely, the ectoderm, which produces the skin and its appendages, the enamel of the teeth, and the nervous system, except the olfactory epithelium, also produces the retina. Therefore, since the skin is susceptible to wheals due to sensitization, we should think of allergy as a possible cause of edema in any other structure coming from the ectoderm. It seems logical in this case that the same food or inhalant that induced the edema of the skin might also have induced the edema of the retina, and the edema, in turn, brought about the retinal separation.

In the literature, the only reference to be found relative to such a possibility was in an article entitled "Allergic ocular manifestations," read by Meyer Wiener[1] before the Section on Ophthalmology and Otolaryngology at the Southern Medical meeting in San Antonio. He stated: "While I have not come across a case of retinal separation reported as due to allergy, I believe a field for investigation is open in this disease."

Certainly, there is no way in which it can be proved that the separation of the retina in this case was due to allergy, but in considering the possibility that allergy may have been the cause, one may well bear in mind the fact that this patient has suffered since childhood from asthma, hay fever, and eczema. The close embryological relationship between the skin and the retina must also be considered. This case is presented with the idea of only suggesting allergy as a possible cause of detached retina. The findings lead us to believe that in a patient suffering from a detached retina, in whose family tree allergy consistently recurs or who himself suffers from some allergic disease, allergy should be thought of as a possible causative factor in the detached retina unless the cause is quite evident.

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[1] Wiener, Meyer. Allergic ocular manifestations. South. Med. Jour., 1935, v. 28, Nov., p. 1011.

UVEITIS: THE ROLE OF INTRAOCULAR TYPHOID-ANTIBODY CONTENT IN TREATMENT*

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The present treatment of nonspecific inflammation of the uveal tract is based chiefly on the conception of its etiology. The usual present concept suggests that it is the result of systemic infection, organisms or their products being carried by the circulation to the uveal tract where they produce inflammatory reactions.

When syphilis and tuberculosis can be eliminated beyond a reasonable doubt, foci of infection become suspect. These are usually considered in the order of their ease of approach. The teeth, tonsils, and nasal sinuses are investigated before the genito-urinary and gastro-enteric tracts. Occasionally enthusiasm for a form of investigation leads to great lengths, especially if this course has been previously successful. In the main, however, all but the enthusiasts for tuberculosis as the cause of a high proportion of uveitis usually have been more disappointed than not by the elimination or treatment of so-called foci of infection. Those sponsoring the importance of tuberculosis vary greatly in their acceptance of criteria for diagnosis and therapeutic results.

I have recently suggested that the so-called nonspecific types of uveal inflammation may be due to sensitization of the uveal tract by the circulating protein products of organisms or of altered tissue in a remote focus.[1] Experimentally, it was observed that sensitization of the uveal tract could be accomplished by anterior-chamber injection of proteins such as horse serum, egg white, and dead organisms or their toxins secured from broth filtrates. This sensitized tissue could be reactivated for varying periods thereafter by intravenous injection of the homologous antigen. Various combinations were then arranged to simulate more closely clinical uveitis, particularly, the recurrent type. Infected dental foci in agar blocks containing live organisms were implanted in the abdominal muscle of rabbits and found to serve as activating antigens after the uveal tract had been sensitized by dead organisms or toxins of the same strain. Thus, a cycle was suggested consisting of local sensitization, activation, and temporary desensitization. Immunity did not seem to play a role, since clinically it is well known that severe uveitis may occur in persons who are apparently in normal general health. Generalized desensitization by means of vaccines—particularly autogenous vaccines—in the light of our observations seemed to depend on recovery of the specific organism acting as the antigen. While it is true that most vaccines have nonspecific properties as well as specific, it was thought that if the cycle within the eye could be broken by a more local activity, the chances of inhibiting further activation would be more likely.

Clinically, the only method of treatment which seems actively to abort an acute uveal inflammation is the parenteral administration of one of several proteins. The varying degrees of shock, rise in temperature, and leucocytosis which accompany such therapy have been considered the factors most responsible for therapeutic benefit. My observations have suggested that these reactions are probably manifestations of newly forming antibodies, or, to state this in another manner,

*From the Children's Hospital Research Foundation.

of foreign protein in the blood with generalized reaction. The therapeutic value of these antibodies has been vaguely classified as "increased bodily defense." From the point of view that perhaps these antibodies had a prominent rather than a secondary therapeutic importance, observations were made concerning the inhibiting qualities of typhoid antibodies.[2] Typhoid vaccine was chosen because it is an agent commonly employed, is easy to administer, and produces measurable, stable, and recoverable antibodies in the blood.

It has long been known that the intraocular vessels are quite impermeable to the passage of antibodies from the blood to the aqueous. After the intravenous administration of typhoid vaccine, even though the blood titer rises to 1 to 100+ in three or four days, the average aqueous titer is only 1 to 2 or less and it remains at this low level unless some local procedure is employed to increase the concentration. If the antibodies in such low concentration were at all responsible for the ocular reaction after protein injection, it could be considered that an increased titer would be more effective. This hypothesis was linked with the previously reported suggestion that nonspecific uveal inflammation was due to bacterial sensitization. In this connection the ability of a protein to "interfere" with the sensitizing and activating properties of another protein when injected into rabbits' eyes was reported.[2] Briefly, the action of horse serum, known to sensitize the uveal tract when injected into the rabbits' anterior chamber, was inhibited by injecting a larger quantity of egg white into the eye immediately before or with the horse serum. This "interference" could be accomplished in varying degree after the sensitizing dose of horse serum, but the later the interfering dose was injected the less effective it became. Typhoid vaccine administered parenterally was found similarly to inhibit the action of a heat-killed streptococcus known to sensitize the uveal tract upon intraocular injection. This interference was greatly enhanced by a higher intraocular typhoid-antibody concentration produced by withdrawing aqueous in the presence of a blood-antibody titer of 1 to 100+. An increase in the aqueous-antibody concentration likewise interfered with activation in varying degree depending upon the titer and also upon the time it was produced.

It seemed possible if bacterial sensitization were responsible for uveitis that the beneficial action of typhoid vaccine in uveal inflammation might, at least in part, be through the interference action of the small concentration of antibodies in the eye. If this were so, a greater concentration might conceivably be more effective. Methods of increasing the intraocular titer have been previously reported.[2] The least traumatic procedures were found to be paracentesis of the anterior chamber and subconjunctival placement of catgut soaked in typhoid vaccine. Local instillations of the vaccine and subconjunctival injections were found to be ineffective, probably because the rich conjunctival circulation caused rapid superficial absorption. Prolonged subconjunctival injections produced great bulbar irritation and later, sloughing. Intraocular vaccine injection was attended by severe local reaction in the rabbit.

Choice of protein for therapy

Since it was believed that the intraocular antibodies derived from the blood were primarily concerned with interfering with the toxic or activating properties of a circulating antigen, the most suitable protein was sought. Such a protein should be easily obtainable and easily employed under average aseptic conditions, safe for intravenous administration, and unattended by severe shock or great febrile reaction. Its antibodies should appear in

the blood in a reasonably short time and be recoverable from the aqueous after paracentesis. The blood antibodies should be present in the blood long enough to supply the aqueous with further quantities if repeated paracenteses are necessary. Lastly, it would be advantageous to be able to restimulate the blood antibodies with a nonshocking dose of the original protein.

Milk, diphtheria antitoxin, and typhoid vaccine, the three chief nonspecific agents used at present, were studied. Clinically, whole boiled milk injected intramuscularly is more effective than any of its derivatives. A quantity necessary to produce a therapeutic effect (4 to 8 c.c.) usually causes a decided shock and considerable rise in temperature. Any beneficial reaction commonly occurs within two to six hours after the febrile reaction or not at all. This may be due to the fact that milk antibodies are very unstable, transient, and can not be recovered from the aqueous even after paracentesis, except occasionally in minute traces. The beneficial effects derived from milk in gonococcal ocular inflammation may result from the acute rise in temperature which frequently is above the optimum for proliferation or growth of the gonococcus. Probably for similar reasons horse serum alone is less effective than milk. Diphtheria antitoxin in horse serum probably owes its efficacy to the antibody properties of the antitoxin. Here again, the presence of circulating antitoxin and a small amount carried to the intraocular fluids may be responsible for interference. Any therapeutic effect from this agent usually occurs a few hours after the febrile reaction or not at all. It was likewise difficult to obtain either horse-serum antiferment or diphtheria antitoxin from the aqueous even after repeated paracenteses. Moreover, many individuals suffer from serum sickness a week later.

While typhoid vaccine produces stable blood antibodies which may be recovered 150 days after one intravenous injection of the vaccine, there is also considerable shock after the use of the whole organism. In the attempt to secure a vaccine that was least toxic and still produced the desired antibodies in sufficient quantity without shock, the various typhoid components were studied. It may not be amiss to consider typhoid components as they are evaluated at present. It has been found, for practical purposes, that there is an "H" flagellar, heat-labile (at 100°C.) antigen; an "O" somatic, heat-stable (at 100°C.) antigen; and a "V 1" antigen which appears to be an indefinite toxic protein. The antibodies formed by the "H" antigen are not sufficient for immunization against typhoid fever, but are, however, potent interfering antibodies in uveal sensitization. Furthermore they may be agglutinated by typhoid antiserum and are much less shocking than the whole vaccine. It was found that the average adult between 15 and 70 years with reasonably good resistance could tolerate an intravenous injection of 40 million typhoid "H" antigen without much shock. The average effective dose was found to be 20 to 25 million, repeated every 36 to 48 hours, depending on the individual reaction. If the inflammation were acute and demanded quicker therapy, this dose usually could be repeated every 24 hours. Twelve to 24 hours after the third injection, the paracentesis of the anterior chamber quickly brought the intraocular antibody concentration to an appreciable height (1 to 8+). Administrations of 15 million were frequently continued at 48-hour periods to heighten the blood-antibody content. This seemed to make further tappings more effective when they were needed.

Treatment of uveal inflammation

Case 1. I. F., a white male, aged 47 years, complained of frequent attacks of pain in the right eye accompanied by

diffuse redness of the globe for the past two years. His internist reported that the physical condition seemed perfect and that no infected foci were apparent. However, he had his tonsils removed. Syphilis and tuberculosis were excluded as far as possible. All forms of local treatment had been instituted as well as many intramuscular injections of milk. The present attack had been more or less constant for three weeks. Vision in this eye was gradually lowered to the ability to see hand movements at two feet. The eye was at the height of an attack, manifested by a widespread, intense purplish-red color and great pain. The posterior surface of the cornea was plastered with heavy precipitates and an exudate covered half the pupillary area. The pupil was moderately dilated and distorted by two posterior synechiae despite regular instillations of atropine. A feeble fundus reflex was obtained. The patient was given typhoid "H" antigen (25-million concentration) intravenously. This was repeated 36 hours after the first dose to add to the positive phase as explained before.[1] Twelve hours later the anterior chamber was punctured under aseptic conditions and local anesthesia, and the aqueous allowed to flow out. Six hours later the pain had completely subsided, and the eye was much less engorged. The blood-typhoid-antibody titer was found to be 1 to 150+ at this time. From this time forward, the eye became whiter and obviously less irritable. The profound effect of this procedure was revealed by the fact that the patient had his nurse call me the first night after the aspiration to thank me for his first night free of pain in three weeks. Five days later the eye was almost white, but the cornea and media were still very cloudy, and the adhesions still present. The vision, however, had risen to 20/100. At this point it was deemed safe to use subconjunctival injections of adrenalin to break the synechiae. This was accomplished with ease, and the pupil dilated rapidly after atropine instillations. In three weeks the pupil was fairly well (5½ mm.) and regularly dilated. The corneal deposits decreased but persisted slightly three months later. Within 10 weeks the pupillary area had been cleared of sufficient debris to permit one to see that the vitreous was clearing. Fundus details could be seen in 3½ months. Within three years one exacerbation occurred during a period of exhaustion. The attack was very mild and lasted only 24 hours; no treatment, other than atropine, was used. The vision in this eye is now 20/30 (corrected) and there are a few, scattered deposits on the cornea and lens and a few vitreous string-like opacities.

Case 2. Mrs. H. B., aged 47 years, white, had an acute iritis of the left eye of six days' duration. This attack was the third recurrence in 18 months. Ocular examination revealed the following: vision O.D. = 20/20, organically negative; O.S. = 20/50, with extensive, intense ciliary injection. The cornea showed a triangular deposit of droplets on the lower posterior surface. The pupil was moderately dilated (atropine). There was a single synechia; a few deposits were seen on the anterior capsule. In the vitreous were fine dustlike opacities. A view of the fundus disclosed no gross lesions.

The tonsils had been removed, the sinuses drained, and several teeth had been extracted during previous attacks. Physical examination was negative, as were all investigations for syphilis and tuberculosis. The patient was given 20 million typhoid "H" antigen intravenously, and there followed a rise in temperature to 100°F. with no shock. Atropine and hot compresses were continued in the meantime. Twenty-four hours later the eye was objectively unchanged and the pain was still intense enough to war-

rant analgesics. Thirty-six hours after the first dose, another dose of 20 million typhoid "H" antigen was administered intravenously. This was attended by no shock, the temperature rose to 100½°F. The acute ocular inflammation still persisted as did the pain. Twelve hours after the last injection, the anterior chamber was aspirated with a small knife needle. Atropine was instilled, the eye bandaged, and the patient allowed to rest. Six hours later the acute inflammatory signs had greatly subsided, there was no pain, the pupil was evenly dilated, and the synechia broken. The blood titer at this time was 1 to 150+. From this time onward recovery was uneventful; the patient left the hospital on the fourth day. Atropine was continued at home for 10 days longer, because of the cell movement in the anterior chamber. In two weeks the posterior corneal deposits had largely disappeared, the pupil was still well dilated, there were a few deposits on the anterior capsule, and the vitreous opacities were gone. Vision at this time was 20/30 with a glass. The patient remained free of attacks for six months at which time a mild attack was experienced. This cleared two days after atropine instillations. Four months later the patient again had a severe attack in the same eye. The usual procedures were again instituted for four days without success. Intravenous administration of typhoid vaccine alone was unavailing until the anterior chamber was aspirated. Prompt recovery again took place. Since this time the patient has remained free from recurrences for 1½ years.

Case 3 (Progressive uveitis). Mrs. T. G., white, aged 42 years, complained of gradual loss of vision in the right eye for the past six months. Her local ophthalmologist had made a diagnosis of chronic uveitis, had prescribed atropine, and had had complete physical examinations made, all of which were negative. Syphilis was excluded. An intradermal injection of 1 to 100,000 mg. tebeprotein was mildly positive. Ocular examination revealed the following: vision O.D. = 20/60 (corrected). There was no pain, tenderness, nor injection. The posterior surface of the cornea was diffusely plastered with fine deposits, there was marked cell movement in the aqueous, and the anterior capsule also was covered with fine deposits. The vitreous was filled with fine dustlike opacities. The pupil was widely dilated. The patient was extremely nervous and apprehensive and since I had not performed the aspiration treatment on a noninflamed eye, I was rather hesitant further to upset the patient's equilibrium. Hence I returned her to her ophthalmologist with the suggestion that he carry on with tebeprotein treatment. This he did for six weeks, but the eye became steadily worse, in that the deposits increased and the vision diminished to 20/100. Inasmuch as I had mentioned the possibility of intraocular antibody concentration to the ophthalmologist, he returned the patient with a request that this be done. The patient was a large, robust woman with entirely negative physical findings. Therefore 40 million typhoid "H" antigen was injected intravenously to produce a high blood titer as quickly as possible. Forty-eight hours later this was repeated and 12 hours thereafter the anterior chamber was aspirated. There was no ocular reaction beyond a slight local irritation. Twenty-four hours later the vision was found to be 20/70. Seven days later the vision was 20/60. There was no obvious change in the amount of intraocular deposits either on the posterior cornea or in the vitreous. The blood titer at this time was 1 to 100+ so the eye was again aspirated to increase intraocular antibodies still further. The aspirated aqueous was found to have a titer of 1 to 24+, so that it could be assumed that the

new aqueous would be higher. The second aspiration produced little more local irritation than the first; it subsided completely in 10 hours. Twenty-four hours later the clearing effect was striking. Pathological processes had apparently been definitely interfered with, and the fine deposits floating free in the aqueous and vitreous were being rapidly absorbed. The vision at this point was 20/50. The eye thereafter cleared steadily until in three weeks the vision was 20/30, and there remained only a few scattered deposits on the posterior surface of the cornea. There have been no recurrences in 1½ years.

Case 4 (Chronic uveitis). Mr. A. W., white, aged 50 years, complained of gradual loss of vision in the right eye for five years. Ocular examination was as follows: vision O.D. = light perception; externally negative; the posterior surface of the cornea showed a few scattered droplets. The pupil reacted quickly to light; there were no adhesions. The anterior capsule showed a few deposits, the vitreous was black, no fundus reflex was obtained. This patient had received practically no treatment; in fact, he said he was not aware that his vision was so low in the right eye until about one month ago. He was a gardener and probably, due to his outside work, the adequate vision in his left eye, which was perfectly normal, masked the defective vision in the right eye. General physical examination revealed nothing abnormal. The patient was given 30 million typhoid "H" antigen intravenously. This was followed by a similar dose, 48 hours later, and another such dose 48 hours afterward. There was very little general reaction, and an insignificant rise in temperature followed each injection. Since the case was of such long standing, it was deemed advisable to wait until the blood titer rose to a higher level than it would in three days. The intervening time also gave an opportunity to watch the change after the vaccine administration without aspiration. There was no change before the aspiration. On the tenth day the blood titer was 1 to 250+, the anterior chamber was aspirated, there was no local reaction; the pupil was kept dilated with atropine. Five days after the aspiration the eye became somewhat irritable, and there was a slight circumcorneal injection. The patient said that his vision was a little clearer. Two days later a slight fundus reflex could be seen, the patient could count fingers at two feet with this eye. The anterior chamber was again aspirated. This was followed by definite and slightly painful ocular irritation which quieted within 24 hours after atropine instillations and hot compresses. The pupil remained widely dilated so that the vitreous could be easily watched. There was an unmistakable breaking-up of the vitreous cloud three days after the second aspiration. This process continued for a month thereafter, at which time the vision was 20/200. Large heavy vitreous opacities were present, but the dimly seen fundus presented large areas of retinochoroiditis. Six months later the vision was only 20/100, and there were many large floating opacities. The patient was not greatly pleased with the result, because the opacities bothered him.

Case 5 (Acute uveitis with secondary glaucoma). E. M., Jr. was a white 10-months-old male whose mother noticed that he had had a "cloudy eye" for the past two days. The right eye was normal. In the left eye was a mild circumcorneal injection. On the cornea were many posterior deposits; the vitreous was hazy throughout. After atropine instillation the tension rose rapidly, but since there was so much deposit accumulating in the anterior chamber, the formation of synechiae was feared if atropine were

discontinued. The patient had been given smallpox vaccine two weeks before and had had a moderate reaction. The parents are both sensitive to several proteins and had both reacted markedly to eggs when they were young. The patient was skin tested and found moderately reactive to several foods, including milk and eggs. Milk and eggs were discontinued, but the tension and dark vitreous still persisted. Three cubic centimeters of modified milk (lactigen) was given intramuscularly five times on alternate days. During the course of the increased tension, it appeared that it was necessary to perform a paracentesis of the anterior chamber and this was concurred in by Dr. H. S. Gradle. The following day the patient was given 2 million intravenous typhoid "H" antigen, and 50 hours later the anterior chamber was aspirated. The tension immediately dropped and remained down in spite of the continuance of atropine. From this time onward, the eye cleared and has remained entirely normal for 15 months.

Summary of cases treated

The treatment of uveal inflammation in those cases in which syphilis, tuberculosis, and sympathetic uveitis can be reasonably excluded, has been directed toward the removal or treatment of obvious or suspected foci of infection. Local treatment consists principally of preventing or breaking iris synechiae and relief of increased intraocular tension when present. The role of nonspecific therapy when its effects were beneficial has been the subject of wide speculation. Shock, rise of temperature, and leucocytosis, being such prominent accompaniments of protein injections, have with reason been considered separately or together as the beneficial factors. Protein antibodies have been considered vaguely as part of "increased general resistance." Our experiments indicated that perhaps the shock, febrile reaction, and leucocytosis were manifestations of the incipient formation of antibodies and were indicative of the presence of a foreign protein (that is, the antibodies) newly formed in the blood stream. It was observed that a heterologous protein in the anterior chamber interfered with the activation of an already sensitized uveal tract and that typhoid antibodies in the aqueous derived from the blood stream performed a similar service. This led to the conception that antibodies produced by protein injection act similarly in "nonspecific" uveal inflammation. It seemed that the case for the allergic theory of uveal inflammation could be strengthened if it were found that increased intraocular typhoid antibody concentration "interfered" with clinical uveal inflammation, especially the recurring type.

In the last three years 40 patients with various types of "nonspecific" uveal inflammation have been treated by this method after five days of treatment with the usual procedures had led to no improvement. All were private patients, were examined as carefully as possible by competent physicians, and had obvious infected foci removed or treated. They were all given the usual local treatment as it was indicated, and to several had been administered various types of nonspecific protein before they were seen by me.

The 40 patients comprised 15 with acute unilateral iritis, two with bilateral iritis, eight with unilateral iridocyclitis, and 15 with posterior uveitis. In 10 patients suffering from unilateral iritis the condition cleared within 12 hours after one paracentesis, in three it cleared 12 hours after the second paracentesis, in two it did not respond at all, and in one the eye remained violently inflamed after the third paracentesis, whereupon it was

deemed inadvisable to repeat the procedure. In this patient the condition finally subsided under supportive treatment in another week.

The two patients with bilateral iritis could be used as controls, since after the course of typhoid antigen had been given, the right eye, which happened to be the more severe in both cases, was aspirated and the left was not. Both right eyes cleared within 24 hours after one aspiration and each left eye remained active for a week and then gradually became quiet. In five of the eight patients with unilateral iridocyclitis the condition was severe and showed no disposition to improve until aspiration was effected. It cleared, however, after one aspiration performed in from 12 to 36 hours. In the other three patients the condition was influenced after three aspirations and upon recurrence yielded again to similar treatment. Eight patients with posterior uveitis presented densely clouded vitreous, had had more than one previous attack, and responded very favorably after one aspiration. In three patients with mild uveal inflammation in their first attack the condition responded at once. The four remaining patients had all the evidence of chronic activity with large, heavy vitreous opacities, much exudate on the lens capsules, and synechiae. The condition here did not respond so rapidly as it did in those in the acute stages, but upon repeated aspiration yielded in some measure. The activity abated as evidenced by reduction in the vitreous haze and some improvement in vision.

Apparently, the procedure is more effective in influencing favorably an acute process, possibly because the activating agent is active and can be inhibited. In the low-grade chronic cases, the tissues probably have been weakened to such an extent and have come so much under the influence of the toxic agents that any inhibiting protein simply affects a small part of the already well-established activator. No patient was harmed by the aspiration, so that there does not appear to be any contraindication to aspiration in uveal-tract inflammation, except possibly the presence of local superficial infection.

Comment

The present treatment of "nonspecific" uveal inflammation is largely empirical. Those cases in which syphilis, tuberculosis, and sympathetic inflammation are probably factors have not been considered here. It is impossible to specify the mechanism by which this treatment operates, but it is suggested that the presence of increased intraocular antibody concentration either[1] directly interferes with the uveal activating agent as it is brought to the eye or[2] that the antibodies unite with available receptor cells, thus rendering the activator inert. The typhoid antibodies themselves must possess some special potency in this respect, beyond that of the usual intraocular protein, which may be increased by simple aspiration of the anterior chamber. I have used typhoid "H" antigen intravenously at the time of traumatic laceration of the ciliary body in three cases as a prophylaxis against sympathetic inflammation. This was done with the aforementioned idea in mind that the intraocular proteins might act as "interfering" agents with the toxin or sensitizing factor before it was able to unite with uveal tissue. These patients were given three doses of 20 million typhoid "H" antigen intravenously at 36-hour intervals. The anterior chambers of the injured eyes were aspirated 48 hours after the last injection. It is possible that it might be feasible to aspirate the fellow eye as well, but since the risk in the presence of a badly injured eye was considered, this was not done. None of these three cases devel-

oped sympathetic inflammation within a period of 10 months and the injured eyes quieted uneventfully. These cases, of course, cannot be considered to have shown any prophylactic value of intraocular antibody content, but the vaccine injections did seem to play a part in the rapid subsidence of the injured eyes. Too few cases have been observed to establish all the contraindications, but so far the method seems to be without danger except possibly in the presence of widespread superficial ocular infection.

Eli Lilly & Company, Indianapolis, kindly furnished typhoid antigens.

311 Doctors' Building.

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DEFECTIVE CENTRAL VISION FOLLOWING SUCCESSFUL OPERATIONS FOR DETACHMENT OF THE RETINA*

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It is common experience that, following a successful operation for detachment of the retina, the central vision is frequently defective. The explanation seems to evolve around the tendency for a detached retina to undergo cystic degeneration, especially in the macular region, and it is this theme that will be discussed.

The statistics of Dunnington and Macnie,[1] compiled from statistics on patients operated on for retinal detachment at the Institute of Ophthalmology, New York City, were reviewed with the idea of determining what percentage of reattachments resulted in normal central vision, and whether or not the duration of the detachment affected the central vision after reattachment. Of the fifty-five cases in which reattachments were effected, a central vision of 20/30 or better was obtained in eighteen, or 32 percent. There were thirty-two cases in which the duration of the detachment had been one month or less, and of these, twelve, or 38 percent of patients, obtained a central vision of 20/30 or better. There were twenty-three cases in which the duration of the detachment had been over one month, and in six of these, or 26 percent, a central vision of 20/30 or better was demonstrated.

From these figures then, one can deduce that approximately normal vision (20/30) is obtained in only about one third of the successful cases,** and that

* From the Institute of Ophthalmology of the Presbyterian Hospital, New York City. Read before the American Academy of Ophthalmology and Otolaryngology, in New York, the forty-first annual convention, September 26 to October 3, 1936.

** It would naturally be desirable to know the difference in the visual acuity obtained in those cases of reattachment in which the macula is detached, and those in which it is not. This does not seem practicable to obtain, however, because sometimes the protrusion of the detached retina prevents a view of the macula, and often there is a very flat, slitlike detachment difficult to determine, especially if the vitreous is cloudy. Anyway, our records do not make specific mention of whether or not the macula is involved unless some pathology is noted.

TABLE 1

THE RESULTS RELATIVE TO THE OCCURRENCE OF RETINAL CYSTS IN 12 ENUCLEATED EYES WITH SIMPLE SEROUS DETACHMENT OF THE RETINA

Number of Case	Duration of Detached Retina	Detachment of Macular Region	Cyst Present in Macula	Cyst Present Elsewhere Also	Cause of Enucleation	History of Trauma	Glaucoma Present	Operation for Detached Retina
1 (See Fig. 1)	2 weeks or less	Yes	Yes	No	Choroidal sarcoma suspected	Yes, hit on top of head 3 months prior to detachment	No	No
2 (See Fig. 2)	2 weeks	Yes	Yes	No	Choroidal sarcoma suspected	No	No	No
3	1 month	Yes	Yes	No	Choroidal sarcoma suspected	No	No	No
4 (See Fig. 3)	2 months	Yes	Yes	No	Choroidal sarcoma suspected	No	No	No
5	3 months	Yes	Yes	Yes	Choroidal sarcoma suspected	No	No	No
6	6 months	Yes	Yes	Yes	Choroidal sarcoma suspected. Secondary glaucoma causing pain.	No	Yes	Yes
7	9 months	Yes	Yes	Yes	Choroidal sarcoma suspected.	No	No	No
8	9 months	Yes	Section not exactly through macula but cysts present in retina temporal to disc.	Yes	Choroidal sarcoma suspected. Secondary glaucoma causing pain.	No	Yes	No
9	1–2 years	Yes	Yes	Yes	Choroidal sarcoma suspected. Secondary glaucoma causing pain.	Yes	Yes	No
10	2 years	Yes	Yes	Yes	Choroidal sarcoma suspected. Secondary glaucoma causing pain.	No	Yes	No
11	Several years	Yes	Yes	Yes	Choroidal sarcoma suspected.	Yes	No	Yes
12 (See Fig. 4)	4 years	Yes	Yes	No	Choroidal sarcoma suspected.	No	No	No

the duration of the detachment is a factor in the visual result.

From the microscopic examination in the routine cases of retinal detachment which come to enucleation, it is well known that cystic spaces frequently occur in the macular region and, to a lesser extent, elsewhere in the retina. This change is usually considered a very late sequela, and its occurrence has been noted almost invariably in eyes in which there was other pathology, so that it is difficult to say to what extent detachment alone was responsible for the cysts, and to what extent other factors.

The detachments of the retina which usually come to microscopic examination are of two kinds:

1. The traumatic, the myopic, and the idiopathic types of very long duration in eyes that have developed an iridocyclitis and secondary glaucoma or atrophy of the globe; or those in eyes that have developed an iridocyclitis and secondary glaucoma or atrophy of the globe following repeated operations for detached retina.

2. The secondary types which occur as the result of contracture of fibrous tissue produced by the organization of an ectogenous or endogenous inflammatory exudate or hemorrhage, or as the result of a choroidal tumor or choroidal hemorrhage.

In most of these instances the retinal detachment has been present for such a long time when the eye comes to enucleation that advanced degenerative changes have taken place in the retina, and it is difficult to determine which of such changes are due to the retinal detachment alone and which are due to the other complicating features, such as atrophy of the globe, glaucoma, hemorrhage, inflammation, and organization. Therefore, an effort was made to study early cases of detachment of the retina in which there were no complicating features. The best opportunity to examine such cases is afforded by instances in which an eye with a simple serous detachment of the retina is enucleated because a sarcoma of the choroid is suspected. Such occasions are rare, and my studies were based upon twelve cases gathered from various sources. Five were from the Registry of Ophthalmic Pathology at the Army Medical Museum, and the others from the Wills Hospital, Wilmer Ophthalmological Institute, Massachusetts Eye and Ear Infirmary, and from the Institute of Ophthalmology, New York City.

These twelve cases of simple serous detachment of the retina, ranging in duration from less than two weeks to four years, all showed cysts in the macula (figs. 1, 2, 3, and 4). It was here that they seemed to appear first and to attain their largest size. In the older cases, of three months or longer, they were frequently also found elsewhere in the retina. Their location was primarily in the external plexiform layer but they were often seen to a less degree in the internal nuclear layer. At first, the retinal elements seemed to be merely separated by edema which localized into small cystic spaces. These coalesced so that ultimately the cysts became larger and separated from contiguous cysts by thin septa of glial tissue. The content of the cysts was usually a homogeneous, colorless fluid which stained weakly with eosin in some instances, particularly when the condition was of long standing. This no doubt represented an increase in the albuminous content due to inspissation.

The cysts present in the retinas in all of the twelve cases studied seemed to be secondary to the detachment. No inflammatory element was present. There was a history of trauma in only three of the cases, and one of these was in the nature of a blow on the top of the head three months prior to the onset of the detach-

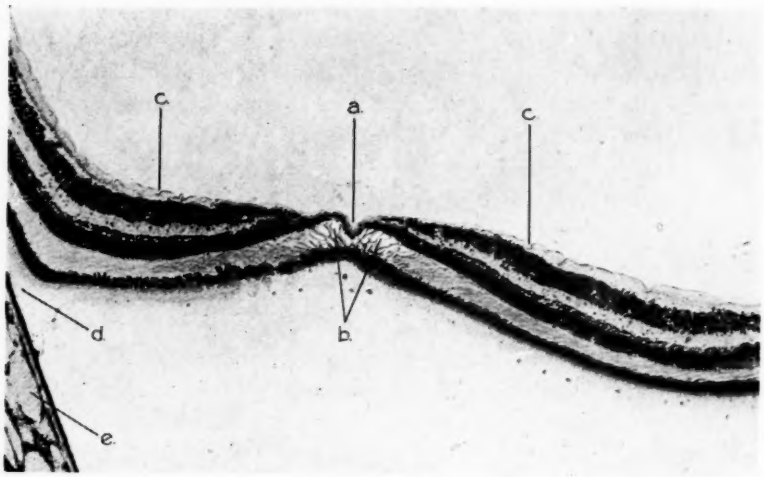

Fig. 1 (Reese). Case 1 (see chart). The greatest detachment of the retina is below and it extends temporally including the macular region. Elsewhere in the eye there is a flat detachment. a., Fovea centralis. b., Cystic spaces in the external plexiform layer (Henle's fiber layer) radiating around the fovea centralis. c., Folds or wrinkles in the internal limiting layer. d., Limit of detachment in macular region. e., Choroid.

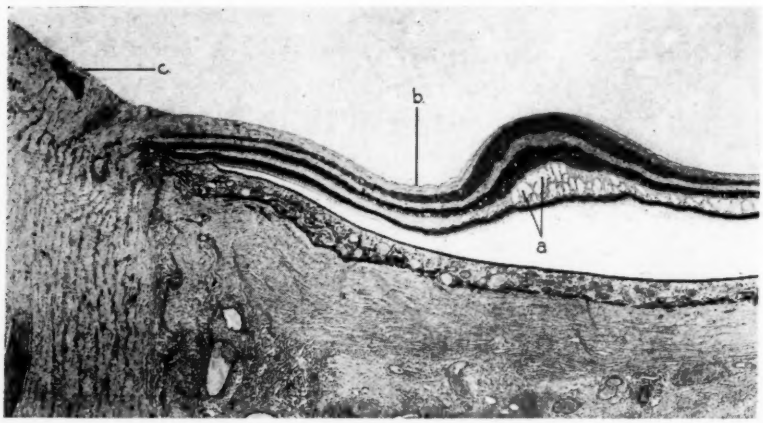

Fig. 2 (Reese). Case 2 (see chart). There is a flat detachment of the retina over the temporal side. The section is through the macular region but not through the fovea. The entire temporal portion of the retina is thickened by edema which separates the various retinal elements. a., Cystic spaces in the external plexiform layer. A few small cystic spaces can be seen in the internal nuclear layer. b., Folds and slight detachment of the internal limiting layer. c., Disc.

ment. Glaucoma was present in four of the cases. An operation for reattachment of the retina was performed in two cases but the changes incident to this did not seem to be a factor in the formation of the cysts.

The edema of the retina and the cyst formations was probably due to the altered retinal circulation which permitted a stasis of tissue fluids. This is more prone to appear in the macula first and more severely because this area is rela-

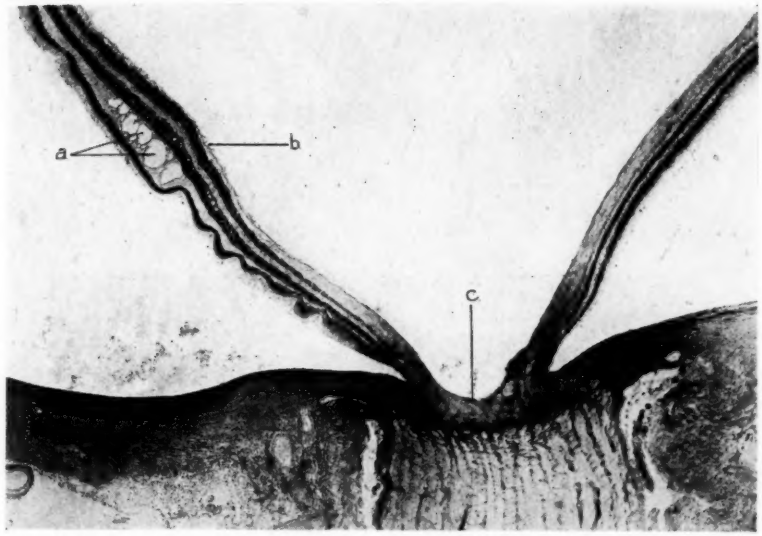

Fig. 3 (Reese). Case 4 (see chart). There is a complete detachment of the retina. The highest site is below, and above there is a flat detachment. a., Cystic spaces in the external plexiform layer with a few very small daughter cysts in the internal nuclear layer. b., Folds in the internal limiting membrane. c., Disc.

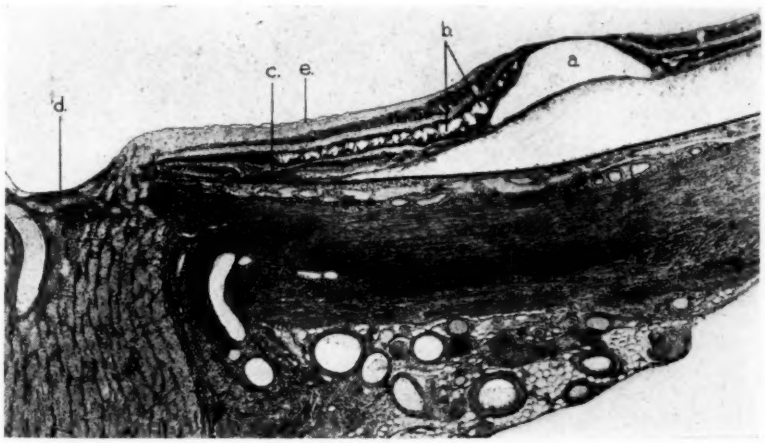

Fig. 4 (Reese). Case 12 (see chart). The entire retina is detached. The highest area is on the nasal side and a more or less flat detachment is present temporally including the macular region. a., A large cyst exactly at the fovea centralis. The anterior and posterior walls are formed by a thin layer of glial tissue. The rods and cones are missing over the site corresponding to the cyst. b., Daughter cysts in the internal nuclear layer. c., A site between the macula and the disc where the rods and cones are missing. They are replaced by a layer of glial tissue which is adherent to the underlying pigment epithelium. This is the limit of the detachment and these are reparative changes occurring as a result of friction between the retina and choroid. d., Physiological cup of optic disc. e., Folds and slight detachment of internal limiting layer.

tively avascular. When a detached retina becomes reattached, the gradual disappearance of the edema probably accounts for the slow progressive improvement in central vision and in the peripheral fields which may take place over a period of months. If cyst formations in the macula have led to a destruction of the neurons, then a permanent defect in central vision is to be expected.

The presence of cysts in the macula or elsewhere in the retina cannot be recognized clinically as such by the ordinary ophthalmoscopic examination. When present, they may appear as poorly demarcated, grayish to yellowish-white foci, or as a rarefied area described usually as a "hole." Vogt[2] has recognized them as cystic spaces by means of the red-free light, and has described their appearance in cases of retinitis pigmentosa, thrombosis of the central vein, and detachment of the retina.

In cases of detachment of the retina, I find that a cystic degeneration of the macula can be recognized if this area is sufficiently close to the underlying choroid to permit a reflection of a sharp narrowed beam of light from the choroidal surface. This beam of light, which is afforded by the usual ophthalmoscope, is directed to one side of the macular region to be studied, and the observer's head shifted until the incident rays reflected from the choroid are detected in the nonilluminated field. This is comparable to retroillumina-

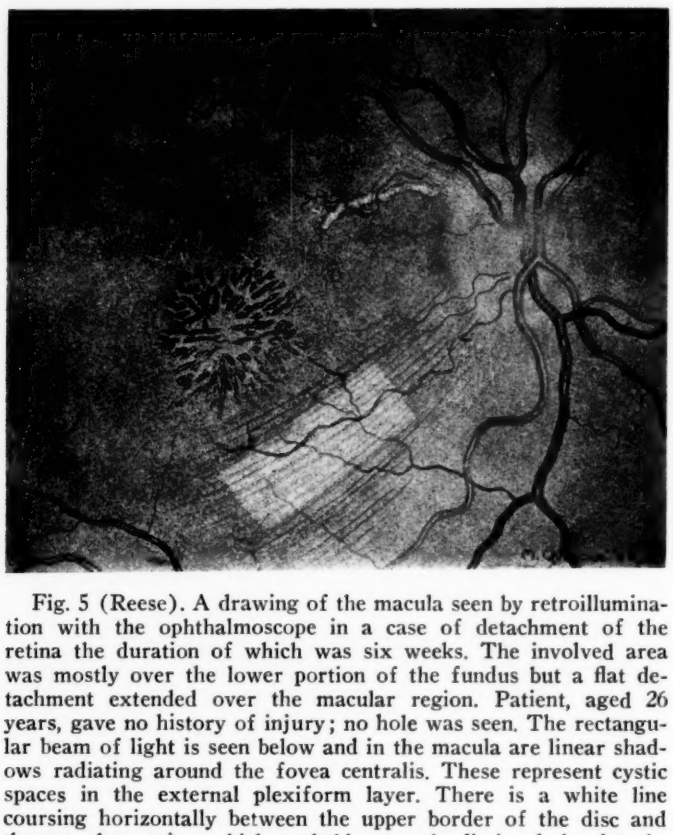

Fig. 5 (Reese). A drawing of the macula seen by retroillumination with the ophthalmoscope in a case of detachment of the retina the duration of which was six weeks. The involved area was mostly over the lower portion of the fundus but a flat detachment extended over the macular region. Patient, aged 26 years, gave no history of injury; no hole was seen. The rectangular beam of light is seen below and in the macula are linear shadows radiating around the fovea centralis. These represent cystic spaces in the external plexiform layer. There is a white line coursing horizontally between the upper border of the disc and the macular region which probably was the limit of the detachment and represents glial repair occasioned by the friction of the rods and cones over the choroid (fig. 4, c).

tion of the cornea by reflected light from the iris in slitlamp examination. When this method is used in suitable cases, that is, in detachments of the macula which are sufficiently close to the underlying choroid to permit a reflection of light from the choroidal surface, quite frequently one can detect rarefied areas of the macula, the borders of which are outlined by dark shadows, and radiating in most instances around the fovea (fig. 5). These must represent cystic spaces in the external plexiform layer (Henle's fiber layer) of the retina, for this is the layer in which the cysts were found in the microscopic sections and this is the only layer of the retina the structure of which radiates from the fovea. In more advanced cases there may be an irregularly round rarefied area at the fovea surrounded by cystic spaces and apparently formed by their confluence (figs. 4 and 6). Such so-called holes can, of course, be seen by the ordinary ophthalmoscopic examination, but the cystic element around their periphery can be made out best by the method of retroillumination. The lesions described here were also studied by means of the red-free light and the Friedenwald slit-ophthalmoscope, but these methods in my hands did not give any additional information. When a macula that has a cystic degeneration becomes reattached following an operation, I have not been able to recognize the cysts as such but they usually appeared as poorly demarcated, hazy, grayish to yellowish-white foci. In some cases, after a few months, pigmentary changes appeared in the macula.

In most instances, what is diagnosed clinically as a hole in the macula certainly represented conglomerate, or confluent cysts.* This is based on the following facts: 1. One often sees in the center of such so-called holes a foveal reflex which apparently comes from the anterior limiting layer of the cyst (fig. 6).

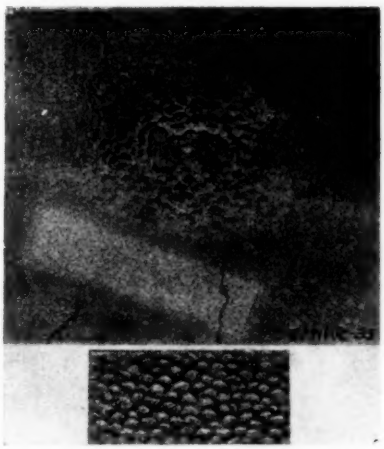

Fig. 6 (Reese). A drawing of the macula seen by retroillumination with the ophthalmoscope in a case of detachment of the retina. The duration was undetermined as the patient was six years old. No history of trauma. A hole, around which there were some low-grade chorioretinitic changes, was noted in the periphery of the fundus below. The rectangular beam of light is seen below and in the macula there is a rarefied central area or so-called hole with irregular borders and surrounded by cystic spaces. In the center of the rarefied area at the site of the fovea centralis is a small light reflex presumably from the anterior limiting layer of a central cyst (fig. 4, a). The small insert below is the Scotch-grain-leather appearance of the retinal surface seen in this case, particularly on the nasal side. This frequent appearance of a detached retina is due to the wrinkling of the internal limiting membrane (figs. 1, c; 2, b; 3, b; and 4, e).

* Cysts and/or holes may also appear in the macula in the following conditions:

1. Following trauma. This is thought by most to be due to a localized edema that leads to a pressure atrophy of the affected retinal elements, forming small cystic spaces the walls of which coalesce to form larger ones. Sometimes the cystic spaces are filled with hemorrhage. A hole may be present after a commotio-retinae disappears.

2. As a complication of an iridocyclitis. Here toxins apparently reach the macular region and give rise to an inflammatory edema. These cysts may be transitory and even reappear.

3. Accompanying retinitis pigmentosa. There

2. By means of red-free light, or by retroillumination with the ophthalmoscope, one can usually see cystic spaces surrounding the so-called hole (figs. 4 and 6), and sometimes it can be detected that the irregular borders of the hole are continuous with the surrounding cysts. Occasionally septa can be seen in the "hole."

3. Actual holes in the macula almost never are seen in microscopic sections, whereas cystic spaces are very common.

CONCLUSIONS

1. A cystic degeneration of the macula accounts for the poor central vision after the reattachment of a detached retina that involved the macular region.

2. The defective central vision so frequently found following successful operations for detachment of the retina suggests that a macular detachment with cyst formation was present even though it might not have been recognized clinically.

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I wish to thank Doctor John M. Wheeler for his kindly interest; Mr. N. E. Ross for his assistance in securing the specimens, the technical work, and photomicrography; and Mr. Gustav E. Bethke and Miss Marjoria Quinlan for the drawings.

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may be cystic formations in the macula, usually in the early stage of the disease. These may be transitory and are usually attributed to edema.

4. Following occlusion of the central vein of the retina. Cysts in the macula are extremely common in this disease. They are due to edema and sometimes are filled with blood.

5. As a complication of retinal arteriosclerosis. These occur in older people and are attributed to edema on an arteriosclerotic basis. They may appear in the early stage of a central senile macular degeneration. Arteriosclerosis on a syphilitic basis may also be the cause of macular cysts.

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ANISEIKONIA*

A CLINICAL STUDY

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Saint Louis

Since September, 1934, we have been studying patients suspected of having aniseikonia at the Washington University Eye Clinic in Saint Louis. The majority of these persons were referred by ophthalmologists; a few applied for examination after having read newspaper or magazine articles about aniseikonia. The number studied has not been large but every case was examined repeatedly. Some were seen five, six, and more times. The routine procedure was a history, refraction, muscle-balance, and then an ophthalmoeikonometric investigation. Each patient had recently consulted an ophthalmologist, so other information was obtained from him.

The statistics to be given later will show that for many iseikonic lenses were prescribed. This was done for the following reasons: 1. Some of the patients were referred with a request from their ophthalmologist to give them a correction if an appreciable size difference existed, inasmuch as no other treatment had been beneficial. 2. In most instances, the patient's financial status did not permit experimenting with various other lenses. In a few, numerous changes in lenses had previously been made without relief of symptoms. 3. Since the entire procedure has been considered a clinical experiment, it was desired to determine the reaction in as large a group as possible. However, in no instance was an iseikonic glass prescribed unless it was justified by either the symptoms or findings or both.

It is very difficult properly to evaluate any new clinical procedure, whether it be medical, surgical, or optical. There are several reasons why this is true: First, we are sometimes swept along by the enthusiasm of the originator. Second, many persons report for treatment who have not been aided by standard therapeutic measures and, therefore, wish to try anything new that is offered. Needless to say, many of these are not suitable subjects. Third, the physician, searching for new methods, may advise those he has been unable to aid to try the most recent procedure.

The chief difficulties in arriving at the value of this particular procedure are: 1. Some patients are found to require a change in the refraction in addition to the size lens. 2. Some have muscle imbalances enough to account for their discomfort. Such persons are likely not to be helped by a size lens. 3. A certain percentage are undoubtedly "eye conscious" or may be classified as psychoneurotics. These may or may not be benefited. 4. Some are so impressed by the new method and instrument that the psychological effect cannot be disregarded.

Regardless of whether the benefit is due to giving them a better refraction, to the new dioptric correction, to the iseikonic lens, or to the psychological effect, 41 percent of those studied in this series were improved to some extent after wearing a size correction. The total number of patients examined was 34. No iseikonic lens was given to five, or 14.7 percent; one case remains unreported; 41 percent were not helped.

Only through more clinical trial and experimentation shall we be able to judge the true value of aniseikonia. Perhaps as

* From the Department of Ophthalmology, Washington University, School of Medicine.

CHART 1. THIS CHART GIVES CHIEF SYMPTOMS, OLD AND NEW CORRECTION,

Age—Sex Occupation	Symptoms	Old Lenses	New Lenses
R. W. 17 M Student	Fatigue and blurring after reading	R. −0.75 D.cyl.ax. 100° L. −1.00 D.sph. ⊖ −0.75 D.cyl.ax. 90°	R. −0.75 D.sph. ⊖ −0.75 D.cyl.ax. 95° L. −1.37 D.sph.
W. S. 29 M Physician	Fatigue and discomfort with reading	R. +1.50 D.sph. ⊖ −0.25 D.cyl.ax. 180° L. +1.50 D.sph. ⊖ −1.50 D.cyl.ax. 180°	R. +1.25 D.sph. ⊖ −0.25 D.cyl.ax. 180° L. +1.62 D.sph. ⊖ −1.50 D.cyl.ax. 180°
M. M. 35 M Engineer	Burning and fatigue Frontal headache	R. +0.75 D.sph. L. +1.00 D.sph. ⊖ −0.25 D.cyl.ax. 180°	R. +1.00 D.sph. ⊖ −0.37 D.cyl.ax. 25° L. +1.00 D.sph. ⊖ −0.25 D.cyl.ax. 180°
W. H. 31 F Housewife	Redness, pain, and aching	R. +0.50 D.sph. ⊖ −1.00 D.cyl.ax. 120° L. +0.50 D.sph. ⊖ −0.50 D.cyl.ax. 65°	R. +1.00 D.sph. ⊖ −1.00 D.cyl.ax. 115° L. +1.00 D.sph. ⊖ −0.50 D.cyl.ax. 80°
H. H. 34 M Physician	Fatigue and discomfort with reading	R. +0.50 D.sph. ⊖ −0.50 D.cyl.ax. 30° L. +0.50 D.sph. ⊖ −0.50 D.cyl.ax. 150°	R. +0.50 D.sph. ⊖ −0.50 D.cyl.ax. 30° L. +0.75 D.sph. ⊖ −0.50 D.cyl.ax. 150°
J. J. 38 M Physician	Fatigue and aching with reading	R. −0.25 D.sph. ⊖ −0.50 D.cyl.ax. 140° L. +0.75 D.sph. ⊖ −0.50 D.cyl.ax. 140°	R. −0.75 D.sph. ⊖ −0.25 D.cyl.ax. 135° L. +0.62 D.sph. ⊖ −0.50 D.cyl.ax. 135°
F. F. 26 M Student	Aching and discomfort with close work	R. −0.75 D.sph. L. −0.25 D.sph.	R. −1.00 D.sph. L. −0.37 D.sph.
O. G. 36 M Physician	Fatigue and headache with close work	R. +1.50 D.sph. ⊖ −2.00 D.cyl.ax. 180° L. +1.75 D.sph. ⊖ −1.75 D.cyl.ax. 180°	R. +1.75 D.sph. ⊖ −2.00 D.cyl.ax. 180° L. +2.00 D.sph. ⊖ −1.75 D.cyl.ax. 180°
R. G. 24 F Housewife	Aching and discomfort with close work	R. +0.75 D.sph. ⊖ −0.25 D.cyl.ax. 175° L. +0.75 D.sph.	R. +0.75 D.sph. ⊖ −0.50 D.cyl.ax. 175° L. +0.75 D.sph. ⊖ −0.25 D.cyl.ax. 25°
C. J. 25 F (None)	Fatigue and aching with close work	R. +0.87 D.sph. ⊖ −0.75 D.cyl.ax. 180° L. +0.50 D.sph. ⊖ −0.50 D.cyl.ax. 15°	R. +0.50 D.sph. ⊖ −0.50 D.cyl.ax. 180° L. +0.37 D.sph. ⊖ −0.50 D.cyl.ax. 15°
G. P. 56 M Insurance	Fatigue and discomfort with close work	R. +3.50 D.sph. ⊖ −1.00 D.cyl.ax. 110° L. +3.62 D.sph. ⊖ −1.25 D.cyl.ax. 65° (Reading lens)	R. +3.00 D.sph. ⊖ −1.00 D.cyl.ax. 110° L. +3.00 D.sph. ⊖ −1.25 D.cyl.ax. 65°
I. C. 39 M Electrician	Aching when reading. Headaches	R. +1.25 D.sph. ⊖ −1.50 D.cyl.ax. 10° L. +1.00 D.sph. ⊖ −0.75 D.cyl.ax. 165°	R. +1.25 D.sph. ⊖ −1.50 D.cyl.ax. 10° L. +0.87 D.sph. ⊖ −0.75 D.cyl.ax. 165°

we learn more of size and shape differences we shall be able to make a better selection of suitable cases and thereby lessen the number of failures.

It is also hoped that more satisfactory methods of determining size and shape differences will be devised. Practically every patient, even the most intelligent and observing, complained of the difficulty and uncertainty in making the observations. These factors necessarily prolong the examination and, therefore, induce fatigue, which itself leads to erroneous results.

The various symptoms given as the result of aniseikonia hardly need repeating. The common ones encountered in this series were fatigue and discomfort with reading and when watching moving pictures, and inability to read for long periods. There were no complaints of vertigo or gastro-intestinal disturbances. Several individuals on direct questioning answered that bright light did produce discomfort. Unfortunately no notation was made as to whether tinted lenses had been worn, but there is no recollection of anyone showing them.

Chart 1 is a summary of the data from 12 of the patients who were aided. In it is given the previous prescription worn and the new power and size lens. Since minus cylinders only are used in the instrument in order to facilitate later calculations and translations, the same scheme has been followed in the chart. These are representative examples of those relieved following the wearing of a size lens. Noteworthy are the following points:

1. The patients with one exception were all young adults. Ten were between 25 and 39 years of age; one was 17 years old; one 56 years old.
2. All complained of discomfort or fatigue or both when doing close work.
3. Except in the instance of the presbyopic patient the muscle balance was apparently not a factor.

SIZE LENS, MUSCLE BALANCE, AND RESULTS IN TWELVE CASES

Iseikonic Addition	Muscle Balance at 16 inches with New Lens	Result	Comment
R. 1.25% ax. 90°	R. H. 1/2 Exo. 2Δ	Good	Change in refraction
R. 1.00% ax. 90° L. 1.50% ax. 180°	R. H. 1 Exo. 5Δ	Good	Seeks further relief
L. 3.00% ax. 90°	No hyperph. Exo. 3Δ	Fairly good	Relief but still has some discomfort
R. 1.00% ax. 90°	No hyperph. Exo. 6Δ	Fair	No permanent relief
R. 1.50% Overall	No hyperph. Exo. 3Δ	Good	Reads with greater comfort
R. 1.50% ⇔ 1.0% ax. 90°	No hyperph. Exo. 1Δ	Good	Much improved. Note change in refraction
R. 3.00% Overall	R. H. 1/2 Exo. 1/2Δ	Fairly good	Relief but still has some discomfort
R. 1.50% ⇔ 1.0% ax. 90°	L. H. 1/2 Exo. 2Δ	Good	Had worn 2Δ vertica prism for short periods
R. 1.00% ⇔ 1.0% ax. 90°	No hyperph. Exo. 5Δ	Good	Greater comfort with reading and sewing
R. 3.00% Overall	No hyperph. Exo. 7Δ	Fair	Slight relief
R. 3.00% ax. 90° L. 0.75% ax. 180°	No hyperph. Exo. 14Δ	Fair	Some better but still complains
R. 1.00% Overall	No hyperph. Exo. 2Δ	Good	Does close work with greater comfort

4. In none in the entire series was the muscle balance appreciably altered after wearing the size correction.
5. The majority were males.

Photophobia has been repeatedly given as one of the prominent symptoms of aniseikonia but no satisfactory explanation has been offered as to why a relative size or shape difference will produce it. W. F. Hardy[1] in his discussion of Jackson's paper on aniseikonia stated: "Photophobia is mentioned as a symptom met with in a high percentage of cases and frequently relieved by iseikonic lenses; such claims along with others give one the impression of being overdrawn. Anyone familiar with the wide distribution and the intricate reflex hook-up of the fifth nerve must appreciate that causes of photophobia are many and varied."

Hughes[2] feels quite differently about photophobia, for he stated, "When, upon using the eyes, ocular discomfort or headaches persist after the ordinary refractive errors have been corrected, aniseikonia should be suspected. Particularly, the presence of photophobia not accounted for by diseased conditions should make one suspect the presence of this particular defect. Many, if not most, patients who find comfort in tinted lenses have aniseikonia as the cause of their discomfort. It has been found that the correction of the aniseikonia relieves the photophobia and that tinted lenses are very rarely necessary." If a size difference is the cause of the photophobia it is difficult to understand how tinted lenses could have given comfort.

In the same article Hughes stated that out of 357 cases examined "aniseikonia was found in 235 or 65.8 percent." Does this mean that in 34 percent there was no measurable difference in size or does it mean that the difference was not more than 0.53 percent, which Carleton and

Madigan suggest may be a normal difference. Thus, in one of the first papers published by Ames, Gliddon, Carleton, and Madigan,[3] they report the small size difference found in a group of 16 athletes, all of whom were practically emmetropic. This is compared with the average size difference of those coming to their clinic for relief of symptoms. Among the first group the difference was 0.53 percent as compared with a 1.53-percent difference in the latter group. Quoting from Carleton and Madigan,[4] "While this is too small a number from which to assume that the averages represent a true normal, it is sufficient to give valuable indications of what the normal may be."

It was felt that a more informative comparison would be one between patients seeking relief and a group of persons

CHART 2. POWER AND SIZE CORRECTION MEASURED AT 16 INCHES*

Initials Sex	Lens correction	Size correction	Muscle Balance
B. O. R. Male	R. −1.62 D.sph. ⊖ −0.37 D.cyl.ax. 60° L. −1.37 D.sph. ⊖ −0.37 D.cyl.ax. 60°	L. 1.50% over-all	Exo. 5Δ
R. O. S. Male	R. +0.50 D.sph. ⊖ −0.25 D.cyl.ax. 25° L. +0.50 D.sph. ⊖ −0.25 D.cyl.ax. 180°	R. 2.00% ⊖ 1.00% ax. 90°	Exo. 3Δ
M. H. Male	R. −0.25 D.sph. L. −0.25 D.sph. ⊖ −0.25 D.cyl.ax. 180°	R. 0.75% ⊖ 2.00% ax. 90°	Exo. 1/2Δ
P. K. C. Female	R. −3.75 D.sph. ⊖ −1.75 D.cyl.ax. 10° L. −3.50 D.sph. ⊖ −2.25 D.cyl.ax. 170°	R. 4.00% ⊖ 1.00% ax. 180°	Exo. 1Δ
E. A. Male	R. −1.37 D.sph. ⊖ −0.50 D.cyl.ax. 10° L. −1.37 D.sph. ⊖ −0.37 D.cyl.ax. 162°	L. 1.50% ⊖ 1.00% ax. 180°	Exo. 1Δ
T. E. S. Male	R. −1.25 D.sph. ⊖ −0.50 D.cyl.ax. 180° L. −3.50 D.sph.	R. 1.50% ⊖ 0.50% ax. 90°	Exo. 2Δ
R. McL. Male	R. +0.37 D.sph. ⊖ −0.25 D.cyl.ax. 180° L. −0.50 D.sph. ⊖ −0.37 D.cyl.ax. 180°	R. 1.00% over-all	Exo. 2Δ
J. M. Male	R. −0.25 D.sph. ⊖ −0.62 D.cyl.ax. 130° L. −0.37 D.sph. ⊖ −0.25 D.cyl.ax. 5°	R. 1.50% ⊖ 2.50% ax. 90°	Exo. 12Δ
A. G. Male	R. +0.75 D.sph. ⊖ −0.25 D.cyl.ax. 20° L. +0.75 D.sph. ⊖ −0.25 D.cyl.ax. 155°	R. 1.50% ax. 90° L. 1.50% ax. 180°	Exo. 2Δ
W. J. Male	R. −2.00 D.sph. ⊖ −0.87 D.cyl.ax. 140° L. −1.00 D.sph. ⊖ −2.25 D.cyl.ax. 40°	L. 1.50% ⊖ 3.50% ax. 90°	
D. G. Female	R. 0.00 L. 0.00	R. 0.50% ⊖ 4.00% ax. 90°	Exo. 2Δ
J. F. Male	R. +2.00 D.sph. ⊖ −2.75 D.cyl.ax. 160° L. +0.50 D.sph. ⊖ −0.50 D.cyl.ax. 10°	R. 1.00% ⊖ 1.00% ax. 90°	Exo. 4Δ
M. D. Male	R. −1.00 D.sph. ⊖ −0.50 D.cyl.ax. 10° L. −1.00 D.sph. ⊖ −0.50 D.cyl.ax. 170°	L. 2.00% over-all	Eso. 7Δ
W. W. Male	R. −0.25 D.sph. ⊖ −0.25 D.cyl.ax. 115° L. −0.25 D.sph. ⊖ −0.25 D.cyl.ax. 75°	R. 1.00% ax. 180°	Eso. 1½Δ
A. C. Male	R. 0.00 D.sph. ⊖ −0.25 D.cyl.ax. 180° L. 0.00 D.sph. ⊖ −0.50 D.cyl.ax. 180°	R. 0.75% ⊖ 1.00% ax. 90°	Exo. 3½Δ

* The subjects were young adults having no asthenopic symptoms.

wearing correcting lenses but having no asthenopia nor any of the symptoms attributed to aniseikonia. This study revealed that the size differences were essentially the same in the two groups. It seems fair to assume, therefore, that many patients requiring a lens correction are comfortable even though an appreciable size difference is present. On the other hand, in view of our present knowledge, can one justly assume that the persons who have symptoms have merely a low tolerance for differences in size? There must be many people wearing a dioptric lens correction that produces a size and shape difference yet who have no ocular discomfort.

Chart 2 gives the refraction and size difference measured on a group of young men and women none of whom complained of asthenopia. In this series the correction and the aniseikonia were determined when the patient was accommodating for 16 inches. The measurements were made at this distance because it had been noted that the subject had greater ease in judging discrepancies at 16 inches, and also that discomfort when doing close work and the inability to read satisfactorily were the predominating complaints of the patients. A comparison of charts 1 and 2 shows that the percentage difference in size in these "normals" is not unlike that in the series of patients with symptoms. In other words, a group of symptomless individuals wearing an ordinary correction show on the average as high a size difference as those supposedly pure aniseikonic patients.

Mention has been made of the change in refraction at the time of the examination for aniseikonia. Ames[5] feels that "... in the cases where the refraction is changed at the same time the aniseikonia is corrected, the amount of the refractive change is too small, that is, usually around 0.25 D. or 0.37 D., to account for the marked relief obtained." It is admitted that the change in refraction in some of the patients is not great; perhaps only 0.25 D. or 0.50 D. Still a change of 0.25 D. would produce about a 0.50-percent size difference; a 0.50 D. change, a 1-percent difference.

It is admitted that some of the patients in this series have had numerous changes in lenses, some of which probably embraced those made at the time the iseikonic glasses were given. The alterations in power lenses which were made at the time the iseikonic prescription was given were almost invariably found before the iseikonic examination. Contrary to the findings of others, it was exceptional to change the dioptric strength of a lens after the introduction of a size lens. In other words, once the refractive error was determined by trial lenses and the ophthalmoeikonometer, it was rarely necessary to alter the dioptric or power lens even though size corrections were introduced.

Another observation has been that the correction of vertical aniseikonia is generally more productive of beneficial results than the correction of the horizontal. It was likewise noted that during examinations the patients had less difficulty making vertical determinations than horizontal ones. This was true in both the near and far test. Not infrequently it was necessary to produce large lateral size changes before the subject was able to recognize a horizontal difference. It was also noted that those patients having the largest lateral phorias had the most difficulty in forming opinions when observing the right and left lights and dots.

That the examination and equipment may have a strong psychological effect on the patient and may in part be productive of beneficial results in some has been sug-

gested by other workers. Some feel, however, that their repeated good results can discount the psychological effect. Thus Ames[6] has said, ". . . there is no question but that a psychological effect does result from putting a patient through the clinical examination for aniseikonia, just as it does in any other medical examination using complicated instrumentation. But that this has been an important factor in bringing about the results that have been obtained can, I think, be absolutely denied."

Nevertheless, as fas as we know, there has been no psychological study made of any of the patients examined. None reported in this series were so studied, so that this paper adds nothing to this aspect. It was noted, however, that several of the more intelligent and thinking patients who wore the iseikonic lenses wondered whether their improvement was actual or psychological.

Summary

1. Some patients are benefited by the addition of a size lens to the dioptric correction. The percentage aided, however, has been less than that reported from other clinics.

2. The size differences of a symptomless group of persons wearing corrections for errors of refraction were equal to the size differences of those seeking relief from asthenopia.

3. Not infrequently the dioptric correction is altered at the time the iseikonic lens is prescribed. Obviously, when this occurs it is not possible to determine, with any assurance, which change is helpful.

4. The muscle balance was not appreciably influenced by the iseikonic lenses.

5. Vertical size determinations were made with greater ease than lateral ones, that is, the patient had less difficulty in making comparisons.

6. The chief objection to the method employed is that it is tedious, tiresome, and difficult for the patient.

7. Sufficient numbers of symptomless individuals should be examined in order to determine, if possible, what a normal size difference might be.

8. Those prescribing iseikonic lenses should avoid incorporating other changes; that is, a change in the strength of the lens should be made before the size correction is prescribed and not at the same time. Otherwise accurate deductions are impossible.

Humboldt Building.

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[6] Ames, A., Jr. *Ibid.*

CONTACT GLASSES*

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History. The idea of contact glasses occurred first to the younger Herschel, astronomer and physicist, about 1827. Details of his experiments are lacking[1] but he apparently took gelatin casts of the eye and made from these a gelatin meniscus.

In 1887 Fick[2] asked Abbé, one of the Zeiss directors, to provide him with ground-glass lenses, but the lenses supplied by this firm were later (1889) found to have been made of blown glass. Fick then turned to Müller** who, in 1889, made the first of those blown contact glasses that his firm has manufactured ever since. Technical improvements stimulated further investigation, which was marked by the papers of Sulzer[3] in 1892, Stock[4] in 1912, and von Rohr and Stock,[5] also in 1912.

It was not until 1911 that Zeiss produced the first ground contact glass, followed in 1912 by a similar glass for use in cases of conical cornea. In 1914, three years after the production of the first ground contact glass, Erggelet[6] suggested their use for aphakia, and two years after this, in 1916, Siegrist[7] advised them for keratoconus. In 1929 Deutsch[8] called attention to their value in irregular astigmatism. From that date there has been a constantly increasing interest in the subject, which has been stimulated by articles in medical journals and even in the lay press.

Types of Contact Glasses. Contact glasses may be ground (Zeiss) or blown (Müller). The ground glass is a thin, transparent, hollowed bowl (fig. 1). It rests on the front of the eyeball under the lids. The scleral portion is in contact with the conjunctiva of the globe: the corneal portion is separated from the cornea by a thin layer of fluid. It is made of specially treated, hard crown glass, of a refractive index of 1.516, and weighs about 0.5 gm. The diameter of the whole glass is about 20 mm., 12 mm. of which are taken up by the corneal portion. It is 0.5 mm. thick at the vertex and 0.3 mm. thick at the edge.

In the test sets provided by Zeiss, the inner curvature of the corneal portion varies in radius from 5 to 11 mm. with gradations of 0.5 mm. and, in the later sets, of 0.25 mm. The radii of the scleral curvature ascend from 11 to 13 mm. in steps of 0.5 mm. All such measurements relate to the inner surface of the glass. Various improvements have recently been made (Hartinger[9a]). The centers may be raised to clear the apex of a keratoconus, the transitional rim between corneal and scleral portion may be ground off, and tints with light-absorptive powers of 25, 50, and 75 percent may be worked into the glass. All the measurements have been etched into the rims of the glasses in the trial set, the scleral radius (omitting the first digit) first, then the radius of the corneal portion. Thus the figures "2/7.6" indicate that the radius of curvature of the scleral portion is 12 mm., that of the corneal portion 7.6 mm. The figures may be preceded by the letter "A," indicating that the center has been raised 0.5 mm., or "B," to show that it has been raised 1.0 mm.

Blown glasses (fig. 2) are manufac-

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**Müller reduced his own myopia from 14 to 1.5 diopters by the application of his own blown lenses. He could, however, wear them for only half an hour at a time.

tured by the same technique as that used in making artificial eyes. Until the advent of molds (see page 615) this was done purely on a trial-and-error basis; and even with a cast of the eye to help him, the blower frequently has to make glass after glass until a proper fit is secured.

Various efforts have been made to improve this type of lens, notably to fuse a ground corneal portion to a blown scleral portion, but final judgment as to the merits of these procedures has been withheld by most writers.*

*Theory.*** The usual method of correcting optical defects entails the use of

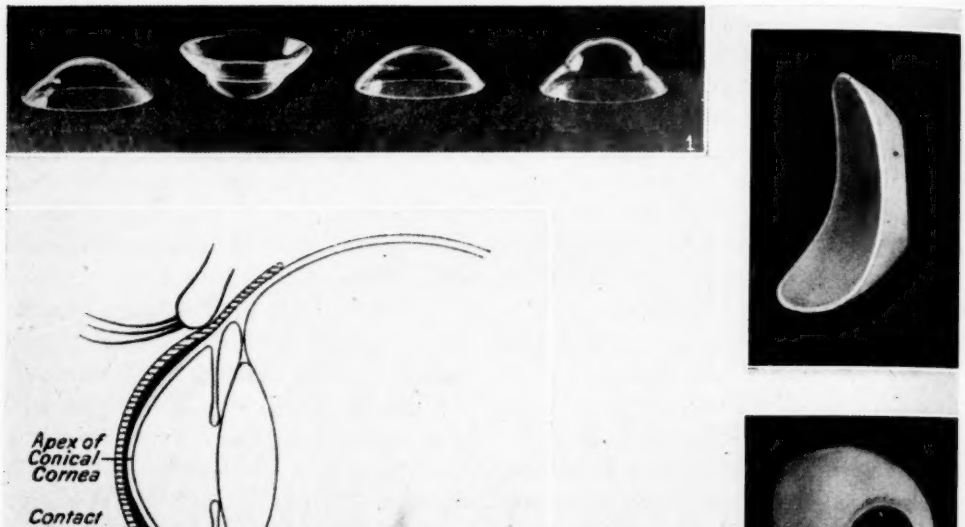

Fig. 1 (Bruce). The ground contact glass (Zeiss).
Fig. 2 (Bruce). The blown contact glass (Müller).
Fig. 3 (Bruce). Diagram to illustrate contact glass in position.

In appearance the blown glasses resemble artificial eyes of the "shell" type. The corneal portion is composed of clear glass. The peripheral part is made to resemble sclera, and is marked with artificial vessels exactly as in an artificial eye. The glass fits over the entire bulbar conjunctiva, and the corneal portion is separated from the cornea by saline solution, as in the case of the ground contact glass.

spectacles. This expedient has at least one inherent defect that is insuperable, arising from the fact that the system is composed of a fixed and a movable component. This state of affairs causes chromatic

* See Dallos's criticism[10b] and Müller-Welt's reply[11].

** Optical and other proofs of the assertions set forth herein may be obtained from the works of Hartinger,[9a, b, c] Heine,[12] and Rugg-Gunn[1].

aberration, limitation of the field of vision, changes in external accommodation, differences in the angle of fixation in anisometropic eyes, and differences in the sizes of the retinal images. Since the use of contact glasses entails a minimum displacement of the cardinal points, their superiority from a purely optical point of view is evident. Now, if the cornea presents a refractive medium so irregular that correction with spectacles is impossible, it is obvious that the otherwise hopeless optical situation can be improved by removing the cornea as a refractive medium and supplying an optically regular substitute of equal refractive power. This can be done by placing in front of the cornea a refractive medium equal in index to the medium behind it. The function of the contact glass, in principle, is to form a new cornea, at the same time eliminating the real cornea as a refractive medium. This it does by holding in front of the real cornea a fluid (physiologic saline) iso-indicial to the fluid behind it (aqueous). The compound-lens system thus produced consists of contact glass, meniscus of saline, and cornea, the focal point of which is coincident with the far point of the eye (fig. 3). Its strength may be altered by grinding a correction on the face of the contact glass or by altering the curvature of the corneal portion.

The correction ground on the surface of the glass should not exceed ± 10 diopters, although it is technically possible for the additions to range as high as ± 20 diopters. Dallos has recently made it possible to increase the power greatly by applying the addition to the center of the glass, rather than distributing it over the whole corneal portion. This optically efficient part is limited to an area 8 mm. in diameter.

Keratoconus. The principal advantages of contact glasses arise from their adaptability to conditions otherwise incapable of improvement. Of these keratoconus is the most important. The number of writers on the subject is increasing rapidly; and favorable reports on the use of contact glasses have come from the pens of Rugg-Gunn,[1] Heine,[12] Anderson,[13] Wassenaar,[14] Kazdan,[15] Judd,[16] Much,[17] Sitchevska,[18] Holmström,[19] Rycroft,[20] Von der Heydt,[21] Thorpe,[22] and many others. Most writers are in agreement as to essentials, but disagree in regard to many details. For instance, the question as to whether the cornea should touch the back of the glass obviously arises more frequently in fitting contact glasses for keratoconus than on any other occasion. Sattler[23] and Dallos[10] believe that no harm results from actual contact, if it can be tolerated, and Thier[24] goes so far as to assert that the cornea should touch the glass. Hartinger[9a] however, disagrees, and points out that actual contact may be avoided by using glasses with raised centers. The writer has seen ulceration at the apex of a conical cornea where it touched the contact glass. The lesion was superficial and disappeared when a glass of proper curvature was supplied.

Diminution in the degree of keratoconus after the wearing of contact glasses has been reported by Heine,[12] Much,[17] and Bertotto.[25] The writer has seen the condition apparently become stationary in a few instances, but has observed one case in which the keratoconus increased slightly over a period of two years despite the almost constant use of a well-tolerated contact glass.

In the other forms of high astigmatism the use of contact glasses is attended by less success. The writer has found that the sclerae of these patients are almost invariably elliptical, so that a glass with

a uniform scleral radius is too loose in one meridian, too tight in the other. Usually the radius of curvature is too short in the vertical meridian, too long in the horizontal; but the opposite condition is often encountered.*

Attempts have been made[6] to grind contact glasses with oval scleral apertures, but in the experience of Sattler[23] these have been unsuccessful. Contact glasses with a diameter of 22 mm. are now available, the extra millimeter of scleral width rendering them more comfortable than the narrower type. Sattler has found that grinding off a part of the scleral portion and tapering the rims were of benefit in difficult cases.

Aphakia. In unilateral aphakia with good vision in the other eye, fusion is impossible. As Rugg-Gunn[1] has so graphically shown, for values in the higher plus curvatures the size of the retinal image diminishes; and with diminishing amounts of aphakic hypermetropia there is a gradual increase in the size of the retinal image. The curve for spectacle correction remains relatively level and represents an enlargement of 25 percent. Of course, the prismatic effect of high plus lenses results in a displacement of the image and probably causes more difficulty than the disparity in the size of the images. The contact glass prevents disturbances of the turning angle, makes possible fusion of an aphakic and a normal eye, and even prevents a deviation of their axes** (Little[27]).

Ametropia. The use of contact glasses in overcoming refractive errors is confined largely to myopia. The soldier who has to wear glasses under a gas mask is frequently rendered helpless by perspiration on the lens (Manganaro[29]) and the deep-sea diver may be incapacitated from the same cause. The vision of the sailor on the bridge (Hamburger[30]) may be seriously hampered by spray or fog. Athletes, actors, and sportsmen occasionally wear contact glasses, but the greatest demand seems to arise from myopic women who dislike the appearance of glasses of the ordinary type. The use of contact glasses in myopia is mentioned by Favory[31] and recommended by Heine[12] and Much.[17] The last two believe that the progress of juvenile myopia may be arrested by this means. Hartinger[9a] points out that in high degrees of myopia contact glasses with raised centers may be used. Many writers—notably Weymann,[32] Beaumont,[33] and Martín Renado[34]—while acknowledging the value of contact glasses, caution against the idea that they can replace the ordinary type of corrective lenses.

Presbyopia is best corrected by wearing the requisite correction in the form of ordinary spectacles.

Other Indications. Additional indications for the use of contact glasses have been listed by Heine.[12] He suggests their adoption in the treatment of neuroparalytic and other keratitides, pemphigus, vernal conjunctivitis, xeroderma, marginal dystrophy, and lagophthalmos. Several authors—Huber,[35] Wright[36]—have been able to support his contentions. The writer has used a contact glass successfully in applying a mucous-membrane graft to the lower cul-de-sac, and also to

* Biffis[28] used excised eyeballs in an attempt to solve the problem of scleral curvature. He restored the normal pressure by injecting formalin and mounted the globes on a projecting machine so that the outlines of the corneal-scleral curvatures were cast on a rectilinear screen. The scleral curvature was not spherical and the attempt to find the corresponding equations by analytic geometry was unsuccessful. The curvature could not be expressed by a well-defined equation of coördinates.

** So far as the writer knows there has been no detailed investigation of the effect of contact glasses on eikonometry. They have been used in investigating lenticular astigmatism (Sallmann[26]).

prevent the formation of adhesions in the same situation.

According to Dallos, the tinted glasses have proved to be of some benefit to albinos. In a case in the writer's experience, the glasses checked the nystagmus during the period when they were being worn. Ascher, quoted by Krämer,[37] recommends a pinhole aperture in an opaque contact glass but, as Friede[38] points out, this greatly narrows the visual field.

Disadvantages. One of the most frequently mentioned obstacles to the use of contact glasses is the difficulty of inserting them. This has been considered of such importance that various appliances have been designed to facilitate the application of the ground discs. There is little doubt that this disadvantage can be easily overcome by most patients, but Sattler[23] believes that certain individuals are sure to have difficulty, as for instance those with tight and spastic eyelids and those with small palpebral fissures. In addition to these physical handicaps, there is often an intense psychological aversion to be overcome.

A very real disadvantage, however, lies in the wide differences in individual tolerance. Reports on this vary greatly: Thus Rall[39] reports tolerance of three quarters to two hours in only one of ten subjects, six of whom were physicians, and his pessimism is shared by Martín Renado[34]; good tolerance is reported by Heine,[12] Much,[17] Sitchevska,[18] Erggelet,[16] Holmström,[19] Clausen discussing Lobeck,[40] and many others. The writer has a patient who has been wearing Zeiss contact glasses sixteen hours a day for nearly five years, with excellent tolerance and no ill effects. The average tolerance, however, seems to be about eight hours. The patients often determine their own period of tolerance and usually remove the glasses every four hours or so for a rest period.[40] Thier[24] asserts that glasses of the Dallos type, prepared from molds, are better tolerated than any other type; he believes that the following requirements must be satisfied:

1. The rim of the glass must remain 1-2 mm. away from the cul-de-sac. It may, however, remain 3-4 mm. away from the upper retrotarsal fold.
2. The glass must very lightly touch the cornea at the center.
3. The limbus of the eye must nowhere be in contact with the limbus of the glass.
4. The main surfaces of support should be the nasal quadrant above and the temporal below, between the insertion of the recti.

These rules (with the exception of the second, about which there is no unanimity in the literature) may be taken as a reflection of the best opinion in fitting any contact glass.

An additional disadvantage which should not be forgotten is the high price of the contact glasses. The Zeiss glass, with or without correction up to 9¾ diopters, costs about $35.00 per disc. With correction of 10 diopters or over, the price is about $45.00 per lens. The continuous transition and raised corneal types cost $40.00 and $45.00, respectively. Blown glasses, if prepared in this country, cost about $75.00 a pair. If the fee of the ophthalmologist be added, the resulting sum is beyond the reach of a considerable proportion of the people.

Safety. The allegation that contact glasses are dangerous cannot be substantiated; indeed, much evidence exists to disprove it. Martín Renado[34] asserts that they may cause corneal erosion, but he also states that he uses cocaine for anesthesia. Heine[12] denies any damage from wearing contact glasses, and Blatt (quoted by Krämer[37]) considers it unlikely. In this country Daily[41] reports a case of a patient who wears contact

glasses while playing football. Erggelet, in his discussion of Lobeck's paper,[40] points out that in experiments on rabbits' eyes a contact glass fractured by a strong blow or falling weight caused no serious lesion. He draws attention, however, to the fact that Dallos has observed two cases of gray cataract appearing subsequent to the adaption of contact glasses, and suggests that patients be instructed to remove the glasses for a while every four hours.

A badly fitted contact glass may conceivably be productive of some harm, but a greater danger lies in the indiscriminate attempts of lay persons to take molds of the eye preparatory to fitting contact glasses. Unless this movement is checked (and enforcement of existing laws is all that would be required) contact glasses may, indirectly, become a source of grave danger to the public.

Methods of Applying. Various appliances have been devised for the insertion of Zeiss contact glasses; but as the patients in the end invariably prefer the simplest method, it is best to train them in this from the beginning.

For the actual testing a tray is prepared (fig. 4). This contains 0.5 percent Pontocaine, 2 percent fluorescein, lukewarm physiologic saline, droppers, a rubber sucker, gauze and adhesive (to occlude the other eye), cellucotton, and the necessary towels and clips. A muscle hook or a curved bone spatula may be added to facilitate the removal of the glass in difficult cases.

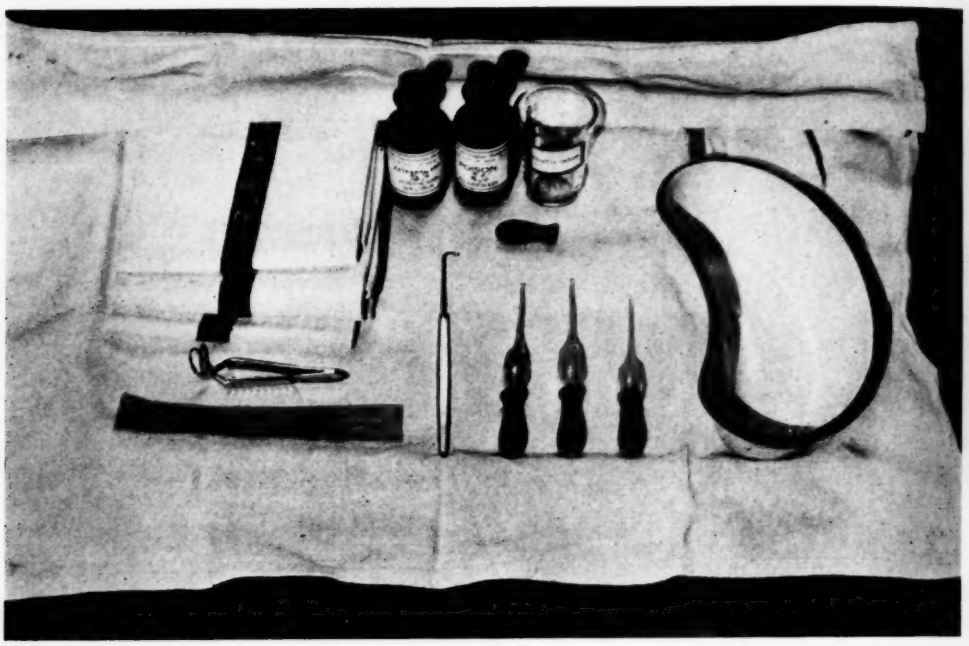

Fig. 4 (Bruce). Tray equipment for fitting contact glasses.

A few drops of anesthetic are instilled into the eye. The first glass to be used may be selected by determining the corneal curvature on an opthalmometer,* but for practical purposes any glass of aver-

* If the readings are given in diopters only, the curvature may be obtained by recourse to the formula $M = \frac{336}{D}$

age curvature—8 mm., for instance—may be used. The disc is placed with its concavity upward on a rubber sucker, no more suction being applied than is just necessary to hold it in position, and is filled with lukewarm saline (fig. 5). The patient bends over, looking down into the disc, and pulls down his own lower lid. The physician holds up the upper lid with one hand and presses the disc firmly over the globe with the other. The lids are allowed to close, the applicator is released by gentle squeezing and swept sidewise from between the lids (fig. 6). If an air bubble is then found to be present the glass must be removed and the process repeated. The removal is carried out by applying the sucker to the apex of the corneal portion of the contact glass and sliding the glass to one side while the eye looks to the other. If difficulty is encountered in removing it, the edge may be raised from the conjunctiva with a muscle hook or the bent curved end of a hairpin. This permits air to enter and the glass comes away easily.

As a rule the physician finds it easier to insert the lower rim first in the lower cul-de-sac. Patients who have to carry out the maneuver unassisted often find it less troublesome to insert the upper rim first. In the beginning it is advisable to have the patients practice before a mirror laid flat or slightly tilted on a table, but they soon learn to dispense with this aid, and in time may even learn to insert the disc without the help of the rubber sucker.

Fig. 5

Fig. 6

Fig. 5 (Bruce). Ground contact glass ready to be applied.
Fig. 6 (Bruce). Application of ground contact glass. The lower lid is pulled downward by the patient, the upper lid upward by the physician.

In some cases the glass may be inserted dry; the upper scleral rim pulled away from the conjunctiva, and saline instilled with a dropper until all the air has been replaced by fluid. This is the standard method for inserting a blown glass, but it is not the method of choice in applying the ground discs.

With the glass in position, the scleral fit must be determined first of all. This is done by inspection. If the conjunctiva is blanched along the rim of the glass, or the flow of the blood in the capillaries is seen to be hampered, the fit is too close

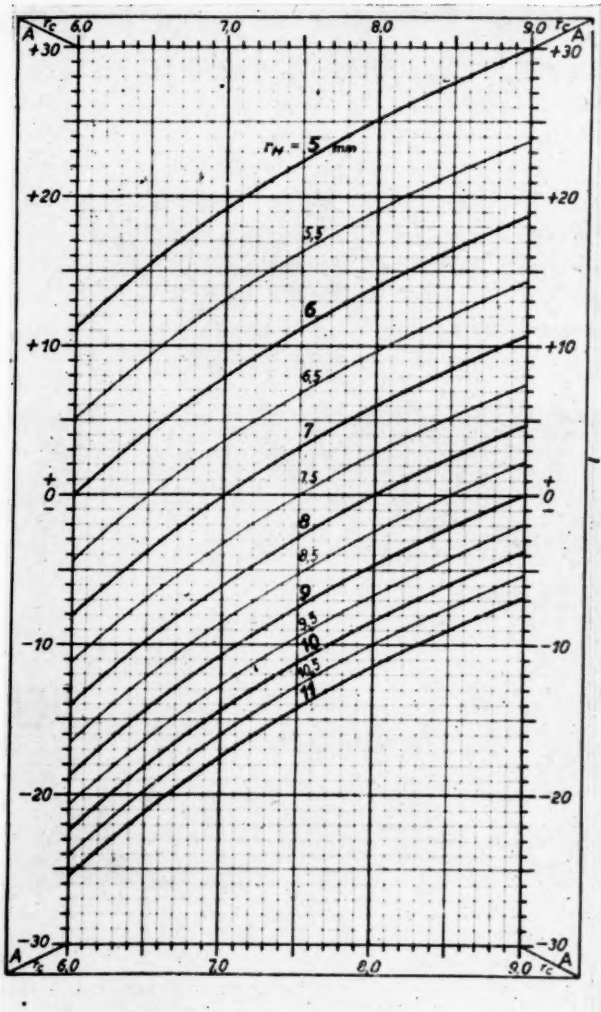

Fig. 7

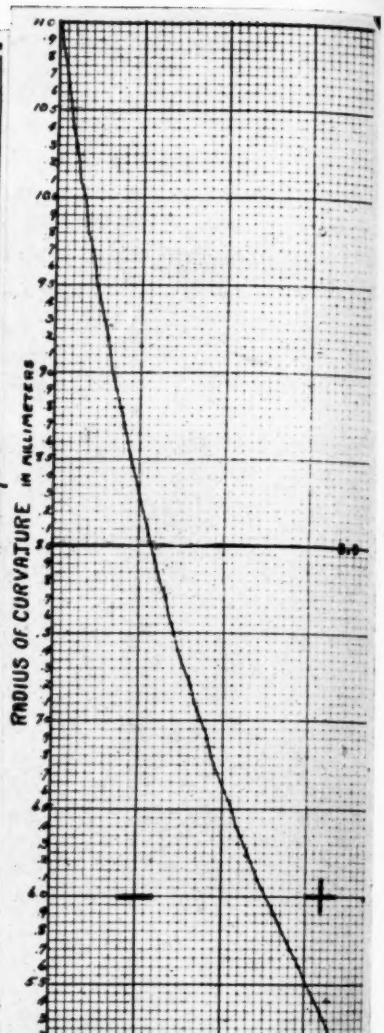

Fig. 8

Fig. 7 (Bruce). Graph for fitting contact glasses. A = refractive error of the eye, r_H = radius of curvature of inner surface of contact glass, n_T = refractive index of lacrimal fluid (1.336), r_C = radius of curvature of outer surface of cornea.

For every value of r_H a curve can be determined on the coördinate system r_C, A.

Any contact glass—say 10.5 mm.—may be adjusted and the correction required—say +11.D—determined by ordinary refractive methods. Tracing the curve 10.5 upward (preferably along the first vertical line on the left) one arrives at a point between the curves r_H 8 mm. and r_H 7.5 mm. The correcting glass should be either r_H 8 mm. with additional power +1.D, or r_H 7.5 mm. with additional power —2.D.

Fig. 8 (Bruce). Graph for use in fitting ground contact glass (Courtesy A. Haustetter, Inc., N.Y.). "The simplest procedure would be to select a lens 8.0 mm. corneal curve, supplementing the necessary plus or minus sphere to improve the vision. Start at the point where the 8.0 corneal straight line crosses the long curved line.

Should a +5. be necessary, count off five spaces to the right of the curved line and proceed downward to a point where the curved line crosses, which in this case would be 7.1.

Should a —5. be supplemented to the 8.0 corneal lens to give better vision, count off five spaces to the left of the curved line and proceed upward until the curved line intersects, which in this case would indicate a 9.0 corneal lens.

The proper scleral curve may be selected by repeated trials until the one that is most comfortable is found."

and the corneal portion is probably "riding too high." If the rim is found to be barely touching the conjunctiva, or actually separated from it, the radius of the scleral curvature is too long, and the glass is resting upon the cornea. It is invariably necessary to obtain a moderately accurate scleral adaptation before going on to a determination of the corneal fit.

With the glass in position, the refraction is determined with spherical lenses from the trial case, exactly as in an ordinary refraction, except that a trial frame is not necessary and the test lens should be held very close to the apex of the cornea. When the glass giving the best vision is found, the proper contact glass is determined by plotting on a graph (Figs. 7, 8). For instance, if a person wearing a contact glass of 8 mm. corneal radius sees normally with a —5.50 sphere, the correct contact glass should have a radius of a curvature of about 9.2 mm. and if a +4.50 be accepted the glass required has a corneal radius of about 7.2 mm. It may be, however, that the afocal glass indicated on the graph is not a good fit—it may encroach upon the limbus or touch the apex of the cornea. In this case a glass that fits well should be applied and the necessary correction ground into the apex by the makers, from the physician's prescription. For instance, in the first case just mentioned, a 9.2-mm. glass may rest upon the cornea, whereas an 8.3-mm. glass just clears the apex. The refraction should now be repeated with the latter glass in position, and the additional correction accepted by the patient —in this case, probably about —1.50 diopters—should be prescribed.

The best way to determine whether or not the apex of the cornea touches the back of the contact glass is to mix a little fluorescein with the saline solution in the disc before it is applied. If the cornea is nowhere in contact a uniform green tint will be seen; if it is, the point of contact will be marked by a round black area in the midst of the surrounding green.

If, as sometimes happens in cases of keratoconus, no glass can be found to clear the cornea, recourse may be had to a glass with a raised center.[9a]

If a correcting trial-case sphere of ±4.00 diopters or more is required to give good vision and this has to be ground

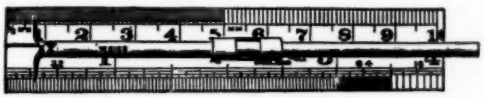

Fig. 9 (Bruce). Scale for measuring distance of correcting lens from apex of contact glass. The correcting glass is removed from the trial case and a pinhole diaphragm substituted. The end of the ruler is placed against the diaphragm and the rod is pushed through the aperture until it touches the apex of the contact glass. The degree of projection is then read off the scale (Courtesy John Weiss & Co., Ltd., London).

upon the apex of the contact glass, the distance of the trial glass from the apex of the cornea must be noted on the prescription. This may be measured directly, or by means of various instruments (fig. 9). The calculations may be made from a slide rule obtainable from Zeiss (fig. 10), but this procedure is best left to the manufacturer. The physician will find it sufficient to enter the findings upon his prescription. If he wishes he may have a special blank prepared (fig. 11), but this is not necessary.

After a satisfactory fit is obtained, the patient is allowed to practice inserting and removing the contact glass. He is then given a supply of Pontocaine, 0.5 percent, and physiologic saline solution and permitted to investigate his tolerance of the glasses at home, for a day or two. If he is unable to tolerate them for more than three or four hours with an anesthetic, he will be unable to do it later without one, and great caution should be

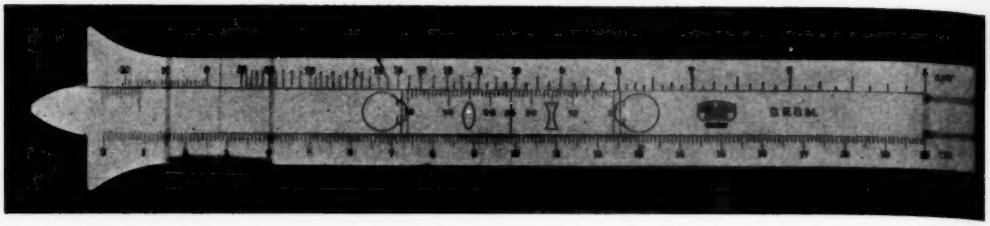

Fig. 10 (Bruce). Slide rule used for making calculations in fitting contact glasses.

exercised in deciding to prescribe them. Usually, however, the tolerance increases with time, and the patients often learn to dispense with an anesthetic altogether.

Reasons for Failure. The principal reason for failure is improper fitting. A tight scleral fit is intolerable, and if the glass presses upon the limbus failure is almost certain. Most physicians attempt to prevent the cornea's touching the back of the glass, and Von der Heydt[21] points out that while a light touch may do no harm if it be tolerated, stronger pressure produces folds in Descemet's membrane. Comfort should not be sacrificed to visual acuity; in other words, it is unwise to obtain normal acuity with an uncomfortable afocal glass when a glass with added correction is more comfortable and produces the same visual result.

A source of difficulty at first is the presence of air bubbles under the glass, but this disappears as facility in inserting the discs is acquired. When air has been admitted it is best to remove the glass and re-insert it.

NAME

ADDRESS

RIGHT EYE

ADDITIONAL POWER D

M/M BETWEEN TEST LENS AND CONTACT LENS

RAISED CORNEA M/M

CORNEAL M/M RADIUS

SCLERAL M/M RADIUS

CONTINUOUS TRANSITION OR REGULAR

BEVELED OR REGULAR

LEFT EYE

ADDITIONAL POWER D

M/M BETWEEN TEST LENS AND CONTACT LENS

RAISED CORNEA M/M

CORNEAL M/M RADIUS

SCLERAL M/M RADIUS

CONTINUOUS TRANSITION OR REGULAR

BEVELED OR REGULAR

REMARKS

M. D.

Fig. 11 (Bruce). Prescription blank for prescribing contact glasses.

About half the patients complain of blurred vision accompanied by rainbow-tinted haloes two to three hours after inserting the contact glass. Under the slit-lamp these patients are found to have a faint epithelial clouding which disappears only after the contact glass has been removed for a few hours.* Because this does not occur under an air bubble accidentally admitted, but only where the fluid has been in contact with the corneal epithelium, it was suggested that the trouble might arise from the type of fluid used, its composition or its reaction. Some experimental work has already been done on this.[23] The strength of the saline solution has been altered, and Ringer's or Tyrode solution has been substituted. Ringer's solution is more satisfactory than saline, but the formation of fungi is troublesome. The writer has been able to prevent this by omitting glucose from the formula and substituting 1 : 10,000 Merthiolate (Lilly) as a preservative. For a while he tested the pH of the lacrimal fluid with nitrazine paper (Squibb) and ordered the solutions neutralized to equal acidity. Because the pH of the tears was invariably found to be 7, it is now his custom to order solutions at pH 7 without preliminary tests of the lacrimal acidity. Relief from the haloes may also be obtained by altering the strength of the saline and determining by experiment which percentage is most effective. If all else fails, it may be necessary to remove the contact glasses for an hour or two, perhaps at luncheon or on some other convenient occasion. The writer believes that the fluid may not be the only cause of the production of haloes, and has some evidence to support his view that pressure may be an additional factor.

Molds. As has already been pointed out, the use of ground contact glasses selected by trial from a test case is limited to eyes of approximately spherical anterior segments. For more than 100 years the taking of molds has been investigated as a means of affording the best adaptation. The greatest advance in modern times is due to the work of Dallos[10] who made molds of the eye with the hydrochloride "Negocoll" and a positive with "Hominit," fashioning a glass to fit the cast. In Dallos's hands this method has been most successful; but as Sattler[23] shows, it takes a great deal of experience to estimate the correct fit and the probable changes necessary for securing comfort (Ramach[42]). A somewhat different technique, whereby the impression is taken in wax, has been devised by Prister.[43]

The method in use at The Institute of Ophthalmology of the Presbyterian Hospital is roughly as follows:[44]

1. Pontocaine 0.5 percent is instilled.
2. Three heaping teaspoons of Negocoll are put into the upper part of a double boiler and 1 oz. of water added.
3. Part of the Negocoll is removed and allowed to cool to 40° C.
4. The patient is placed upon his back and directed to look at a spot on the ceiling. A speculum is inserted, a hollow bottomless aluminum container held over the globe, and the Negocoll poured directly over the cornea.

Molds have recently been utilized to make contact shells from resin rather than from glass.[45] This undertaking is still in the experimental stage, and final judgment will have to be withheld until further experimental work has been done, particularly in regard to the effect on resin of the lacrimal secretions.

Ground v. Blown Contact Glasses. Because skilled glass blowers are not everywhere available, whereas access to a

* Much[17] asserts that the haziness tends to disappear as the contact glasses are worn, but this is denied by Sattler.[23] The writer's experience inclines him to agree with Sattler.

Zeiss test case is comparatively easy, the ground contact glasses are more widely used. They are certainly more effective optically.* Testimony to the superior comfort of the blown glasses is given by Holmström,[19] Lindner,[46] Fleischer, Seidel, and Clausen discussing Lobeck,[40] Sitchevska,[18] and many others. Heine, however, who has had tremendous experience in this work, prefers the ground glass.[12]

The Zeiss disc is made of very hard glass and lasts much longer than the blown glass, which, like an artificial eye, is eroded in time by the lacrimal secretions. Lauber's report[47] of a blown glass being worn for six years is probably exceptional, two years being the average period of usefulness.

How many test glasses should be purchased? Heine[12] believes that many test glasses are necessary—the Kiel Clinic has 300. Procksch[48] considers 12 or 15 enough, although she admits that supplementary correction with simple glasses must be made more frequently. Gualdi[49] suggests the manufacture of contact glasses having only one inner curve, which is the same for the corneal and scleral portions, pointing out that only six sets would then be necessary.

As a general rule, it will be found that as the examiner becomes more experienced he will require fewer test glasses in order to determine the probable fit. The beginner should, therefore, incline toward the larger sets, while the more experienced physician will find the small set adequate. The Zeiss set of 27 glasses should fill all requirements of the average practitioner.

635 West One Hundred Sixty-fifth Street.

* As Siegrist[7] has shown, blown glasses often exhibit some astigmatic error. This is never the case in the ground lenses.

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THE RHINOGENIC ORIGIN OF SYMPATHETHIC OPHTHALMIA

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THE ANALOGY BETWEEN SPONTANEOUS SEROUS IRITIS AND SYMPATHETIC OPHTHALMIA

In 1936 Peters compiled a report of all contributions relating to sympathetic ophthalmia that were published in the course of the last 15 years. In number there were 639, but not one among them all dealt with the subject of the sympathizing capacity of spontaneous uveitis, although Meller as early as in 1913 had declared that we would obtain a whole series of important conclusions as to the pathogenesis, if we could but succeed in establishing the identity between spontaneous serous iritis and sympathetic ophthalmia. This statement by Meller died away without effect, for nothing has been done with the idea since that time. It is this fact that has stimulated me to emphasize to competent ophthalmologists its great importance, and to support the theory with the results of my own observations. For that sympathetic opthalmia may occur in the absence of a penetrating injury and operation was borne out in a case reported by Leitner, in which the lens, as the result of a blunt blow became dislocated into the vitreous humor, contributing to the occurrence of sympathetic ophthalmia in the fellow eye, two weeks subsequently, in spite of intact membranes; and likewise by the fact that its occurrence is frequently encountered in the presence of uveal sarcoma.

Knies had under his care a girl of 19 years who presented herself for treatment on January 25, 1878. In this patient a bilateral serous iritis had developed in an interval of some weeks. She died at the Canton Hospital, in Zürich, on the 7th of March in the same year after an attack of croupous laryngitis which lasted for two days. The post-mortem examination revealed death from suffocation caused by the laryngeal croup.

Knies removed both eyeballs together with the optic nerve up to the chiasma, and reported on the histological finding at the Heidelberg Congress, in 1879. Both eyeballs exhibited the pathologic-anatomic changes usually seen in cases of serous iritis; these changes extended to all three parts of the uvea. In addition, and to his great surprise, he observed infiltrations in the pia mater also which extended up to the chiasma. He very much regretted not having removed the chiasma as well. This he had failed to do because he did not believe it possible that the changes mentioned could develop in the optic nerve also. In spite of this fact he expressed the opinion that here the spontaneous serous iritis extended from one eye to the other by way of the optic nerve, and he consequently did not deem it improbable that spontaneous serous iritis is identical with sympathetic ophthalmia. This pathological process had started in the other eye with an optic neuritis. The Congress did not accept his conclusion, arguing that serous iritis is a constitutional disease and can therefore not be brought into relation with the sympathetic inflammation. Thereupon the importance of the case was buried for a long time. Nor was it brought to the attention of the ophthalmic world even when 14 years subsequently, that is, in 1893, Deutschmann performed an autopsy upon a man who died of cancer of the stomach, and who, in the latter months of life had been under treatment for sympathetic ophthalmia. The inflam-

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mation in the sympathizing eye had also begun with optic neuritis. Deutschmann subjected to histological examination not only the two globes and the optic nerves but also the chiasma, and all of these organs revealed the same changes as those that were found by Knies.

The work of Knies was brought to light again by Professor Groenouw in 1900, who made an autopsy on a girl of 16 years. This patient had suffered from a bilateral serous iritis and had died of dysentery. Groenouw subjected to histological examination both globes, the optic nerves, and the chiasma, and in spite of the fact that in both eyes the posterior half of the uvea, likewise the optic nerve and the chiasma, were normal, yet he was inclined to accept Knies's conception, but only in regard to cases in which inflammation extended also to the posterior half of the uvea.

In my opinion it is possible, even in Groenouw's case, that the bilateral affection was brought about by a sympathetic process, for it is not impossible that the passage was by way of the ciliary nerves; and if the latter and also the ciliary ganglion had been histologically examined, it is probable that they would have been found to display inflammatory infiltration, just as was observed in the animal experiments of Velhagen.

Repeated mention of the analogy between spontaneous serous iritis and sympathetic ophthalmia was made only in 1905, when E. Fuchs asserted, on the ground of the histological findings in numerous enucleated eyes, that the two affections are identical. His statement has been fully corroborated by the tests made by Kitamura (1907), Botteri (1908), and Weigelin (1910). Meller even extended this conception in 1913, by including in this group a case in which no enucleation was performed, and he felt himself justified in assuming merely on the ground of the clinical manifestations that the uveitis in both eyes had come about through sympathetic ophthalmia.

This circumstance leads me to describe here a pertinent case of my own:

Case Report. On May 1, 1928, a woman, aged 68 years, consulted me because of a serous iritis which had started in her right eye on the 23d of April. During two months of constant and painstaking observation the affection followed this very peculiar course, namely, that on the right side the precipitates made their appearance first, and only afterwards did the optic neuritis appear, while in the left eye the same process was observed after 25 days, but in the reverse order, as a typical picture of sympathetic inflammation. In as much, however, as the inflammatory symptoms of both eyes were strikingly mild, and the patient nevertheless complained of uncontrollable headache, I suspected that the latter was, perhaps, caused by the disease of some of the sinuses. For this reason she was subjected to rhinological examination. The results were as follows: Chronic rhinitis and deviation of the septum, confined exclusively to the side of the primary eye, the other side being intact. I inserted cocaine-adrenalin swabs into the middle nasal chamber, in order to drain the retained secretion and the pathogenic agents from the neighboring accessory sinuses, whereupon, in a few days' time, not only the headache ceased, but the precipitates also rapidly disappeared. It was at this time that I hit upon the idea that the pathogenic agents migrated into the right eye from the accessory sinus, and thence proceeded along the optic nerve into the other eye. My assumption was corroborated by the fact that by the aid of these tampons both eyes recovered complete vision. And not only so, but encouraged by this success I subjected nine other patients to similar treatment and achieved full re-

covery irrespective of the individuals' having had syphilis or tuberculosis. Finally, I wish to emphasize that these 10 cases, without exception, began in the cool months, between October and April, while between May and October not a single case occurred.*

That this is not a matter of coincidence is proved also by an interesting observation of mine, namely, that the 15 cases of serous iritis published by Schieck in 1934, and qualified by him as tuberculous, occurred without a single exception in the months between October and April, while during the period from May to September not a single case was recorded. The exactly congruent periodical appearance of 25 unselected cases permits the conclusion that the causative pathogenic agent in all these instances could be the same, and of nasal origin. On the basis of these observations we are justified in terming serous iritis a "seasonal affection" independent not only of syphilis, but very probably also of Koch's bacillus, for, according to Hajek (Vienna), tuberculosis of the sinuses is decidedly uncommon.

The rhinogenic theory

Since sympathetic ophthalmia and spontaneous serous iritis seem to be identical, on the basis of the foregoing premises, and since, in view of the striking results achieved with the nasal tampons, we are justified in assuming that the pathologic agent of serous iritis is hidden in the accessory nasal sinuses, therefore, by analogy, we must seek the etiologic agent of sympathetic ophthalmia also at the same site.

The different pathogenic agents enter the sinuses from the air, and thence, either by hematogenic pathways or through the various defects of the bony separating wall, as also through its medullary cavities, they may gain access into the eyeball. According to Hajek, microörganisms may proceed from the sinuses along the secondarily diseased nasal mucous membrane and through the lacrimal duct into the conjunctival sac; consequently, it may easily happen that by these means they can penetrate into the eyeball upon the occasion of an operation or injury. Of the pathogenic organisms which commonly infest the sinuses the most frequent are Pfeiffer bacilli. Thus if we take into consideration the three principal properties of this bacillus —namely, that it acts pathogenically upon the epithelium; that it is hemoglobinophilic; and that it does not occur in animals—the thought readily presents itself that the unknown pathologic agent might be the Pfeiffer bacillus, or some of its group. These are entirely congruent with the properties of sympathetic ophthalmia, for, according to the results of Vennemann and Schieck's observations, serous iritis is the superficial inflammation of the tissues occupying the anterior chamber; on the other hand, the fact that injury of the hyperemic ciliary body offers much greater opportunity for the occurrence of sympathetic ophthalmia than injury of the bloodless cornea, lens, or vitreous humor, bears out the hypothesis that the causative agent is hemoglobinophilic. Finally, it is generally well known that neither influenza nor sympathetic ophthalmia has ever occurred in animals.

The pathologic agent can enter the fellow eye by two paths, this being related to the fact that sympathetic ophthalmia usually appears in the primary eye in two different forms: (a) the inflammation involves all three parts of the uvea, (b) the inflammation is confined to the region of the iris and ciliary body, the choroid and optic nerve remaining unharmed.

* These ten case histories were published in the Zeitschrift für Augenheilkunde, 1930, volume 72.

In the first instance the mediator is the optic nerve, in the second the ciliary nerve, with the involvement of the sympathetic nervous system.

On the basis of the foregoing antecedents we can solve all the mysteries of sympathetic ophthalmia which hitherto have escaped solution by any one theory that has been proposed. Of these mysteries only the noteworthy ones are enumerated:

1. Why does sympathetic ophthalmia often follow the injury of the primary eye only after the passage of years, and in what manner does the fresh inflammatory focus come into existence in the latter?

2. Why is sympathetic ophthalmia so infrequent after the perforation of a corneal ulcer?

3. How can Peters's established fact be explained; namely, that the perforation of gonorrheal ulcers offers a far more favorable opportunity to the onset of sympathetic ophthalmia than that of keratitic ulcers of other types?

Answer to question 1. The prevailing concept, namely, that in such cases the causative agents stay in the eyeball for years, inactively, and that sympathetic ophthalmia is only an evidence of a new flaring up of the old inflammation, is not satisfactory, for in my opinion the causative agent cannot live for even a single day in its favorite culture medium without propagating. Accordingly, this circumstance can be explained only by assuming that the injury had an aseptical course and the unknown pathologic agent failed to enter the eye; that only after months or years did the organisms migrate from the neighboring sinuses into the predisposed uvea and there bring about the fresh inflammatory focus. Similarly also may be explained and interpreted the type of sympathetic ophthalmia that occurs in connection with spontaneous uveitis, sarcoma of the uvea, and nonperforating injuries.

Answer to questions 2 and 3. The solution rests upon the supposition that the pathogenic agent is the Pfeiffer bacillus, a pronouncedly hemoglobinophilic organism and one which, therefore, cannot settle in the cornea. In case of symbiosis with other pathogenic agents, however, it may propagate even on a bloodless culture-medium. Such are, for example, Staphylococcus pyogenes-aureus, xerosis, C. diphtheriae, and especially the gonococcus (Kolle-Hetsch). Thus, the bacillus in question may settle, in case of symbiosis, even on the bloodless cornea, and the organism best constituted to promote this is the gonococcus. Consequently sympathetic ophthalmia in this connection occurs more frequently than in connection with corneal ulcers of other types.

International statistics

Should it prove to be true that the causative agent of sympathetic ophthalmia is situated in the nasal accessory sinuses, its occurrence in the fall and winter months ought to be observed much more frequently than in the spring and summer months, since cases of rhinitis and sinusitis are prevalent mainly in the cool season. To ascertain the correctness of this assumption, I requested Prof. Emile de Grósz, of the Budapest university, to permit me to make a study of the case histories of his eye clinic. With his kind permission I obtained 69 cases from the material of recent decades. The result, if this investigation is tabulated, is as follows:

Number of Cases	The Onset in the Other Eye	
	October–April	May–September
69	53	16

This proportion gains much in importance if we reflect that it is just the mild months which constitute the principal season for agricultural and building activities, in which period employment and, correspondingly, the number of accidental injuries are incomparably higher. Yet in spite of this the occurrence of sympathetic ophthalmia is strikingly lower than in the winter months.

Although the foregoing results went far to corroborate my theory, it nevertheless seemed advantageous to support them with statistics set up on a broader basis. To this end I last year sent questionnaires to eye clinics in the five continents of the world requesting data relating to cases of sympathetic ophthalmia treated in the past 10 years. In the course of a year only 10 blanks accurately filled out were returned. This relatively small number of responses may be at-

TABLE 1

THE ONSET OF SYMPATHETIC OPHTHALMIA

Source of Data	Number of Cases	The Onset in the Other Eye		Annual Number of New Out-patients
		Oct.–April	May–Sept.	
Baltimore Johns Hopkins Hospital *Prof. W. Wilmer*	15	11	4	5,000
Berlin Univ. Augenklinik *Prof. W. Loehlein*	12	8	4	11,000
*Budapest** University Eye Clinic *Prof. Emile de Grósz*	11	9	2	22,000
Ghiza, Egypt Memorial Laboratory *Prof. R. P. Wilson*	17	14	3	?
London† Moorfields Eye Hospital *Prof. C. Dee Shapland*	9	7	2	52,000
Madras Govt. Ophth. Hospital *Col. Wright*	8	5	3	27,000
Manchester Royal Eye Hospital *Prof. H. H. McNabb*	24	17	7	30,000
Munich Univ. Eye Hospital *Prof. K. Wessely*	11	9	2	18,000
Stockholm Serafine Lazarette *Prof. J. W. Nordenson*	9	6	3	10,000
Vienna I. Univ. Eye Clinic *Prof. J. Meller*	8	7	1	15,000
Total	124	93	31	

* This chart refers to only 6 years.
† From technical causes refers to only 2 years.

tributed to the fact that very few cases of sympathetic ophthalmia, or none, occurred during the period in question in several of the clinics.

Table 1 shows detailed statistics, embracing nearly 1½ million eye patients, in regard to the time of the onset of sympathetic ophthalmia. From these data it appears that the time of the onset of sympathetic ophthalmia shows the same distribution as in 69 cases tabulated in the preceding table. If the sum of the two groups is taken, the following striking results are obtained:

Number of Cases	Onset in the Other Eye	
	October–April	May–September
193	146	47

That is to say, three fourths of the cases made their appearance in the influenza months; in fact, the proportion at the clinic of Professor Meller was 7:1; at the clinics of de Grósz and Wessely, respectively, it was 9:2 each. On this basis I believe we are justified in regarding sympathetic ophthalmia like serous iritis as a seasonal affection.*

From the statistical chart it is obvious also that with a comparable number of new admissions the incidence of sympathetic ophthalmia cases was just three times as great in Manchester as in Madras. Even London shows a proportion of 3:1 as against Madras. This fact was striking also to the Indian ophthalmologists, for last year Dr. Koman Nayar read a paper at the All-India Ophthalmological Congress, in which he analyzed those cases of sympathetic ophthalmia which were attended at the Government Ophthalmic Hospital at Madras during the last 15 years. At the end of his paper he asked for an explanation of the fact that there are so strikingly few cases of sympathetic ophthalmia in India and inquired as to the reason for their very mild course. On the basis of my theory an answer is very easily and simply given; namely, the season of catarrhal infections is much shorter in India, and certainly milder too, than it is in Western Europe, and especially in foggy England.

The connection between nasal affections and sympathetic ophthalmia is supported also by the following data: Professor Eversbusch, of Munich, in 1903 wrote as follows: "Among other things I deem it worth mentioning that I have often known the outbreak of the sympathetic affection in the second eye to be preceded by a vigorous swelling of the mucous membrane, usually confined to the nasal meatus, corresponding to the side of the primary eye. . . . I have also observed several times that every exacerbation of sympathetic iridocyclitis was accompanied by more or less severe catarrhal symptoms in the nose, or, if such were already present, by their aggravation; and this was striking to the patients themselves."

In the same article he describes a serious case of sympathetic ophthalmia in which the patient withheld consent to enucleation. In as much as the customary treatments proved utterly futile, the physician proceeded to treat the simultaneously existing nasal catarrh, whereupon all the inflammatory symptoms, likewise the vision presented a striking and instan-

* That even relapses of sympathetic ophthalmia occur with a predilection in the cool months of the year, is vividly illustrated in the following two publications which appeared in the Klinische Monatsblätter für Augenheilkunde last year:

1. The case reported by Bückler, in which, during an observation period of ten years, there were nine fresh outbreaks, and in every instance during the cold seasons—five times in November.

2. The case reported by Professor Groenouw, in which, during an observation period of 19 years, there were ten recurrences, always in the cold months—five times in December.

taneous amelioration. But within 10 days, in connection with a repeated aggravation of the nasal condition, the ocular symptoms also became more severe, and the patient consented to have his impaired eye enucleated. It is regrettable that this prominent specialist did not carry out his deductions, nor link his observation with the pathogenesis.

Ziehm published three cases of sympathetic ophthalmia in 1908, in which treatment of the nasal passages brought about striking improvement. In Key's case when all customary drugs proved inefficacious, treatment of the nose brought about a favorable turn.

From the international statistical charts which I received, many object lessons may be drawn, of which two may be mentioned:

Iridocyclitis starting with neuritis occurred in only 14 percent of cases, which percentage would undoubtedly be higher if all the cases had been presented in the early stage of the disease, when the examination of the eyegrounds had not as yet been hindered by the precipitates. This common clinical phenomenon confirms the significant role the optic nerve plays in transferring the affection to the fellow eye.

Cases of sympathetic ophthalmia following cataract operations in these statistics attained an average of 40 percent: There is, however, one chart in which this figure rose to 75 percent. Doubtless a faulty technique in making the section considerably furthered the occurrence of sympathetic ophthalmia. It is my opinion that, as a consequence of such poor technique, deficient and protracted cicatrization of the wound occurred, so that the time during which the eye was exposed to ectogenous infection was unduly prolonged.

Summarizing the lessons to be drawn from the statistics, two important facts become prominent:

1. The seasonal appearance of sympathetic ophthalmia, and hand in hand with it the rhinogenic, that is to say, the ectogenous origin of the causative agents. 2. The frequent occurrence of iridocyclitis commencing with neuritis in the sympathizing eye. This points to the significant role played by the optic nerve in effecting the transfer of the affection to the fellow eye.

A sharp contrast is observed when comparing the author's theory with the rest of the theories relating to sympathetic ophthalmia. Thus, their starting point is the endogenous origin of the pathogenic agent, and the path by which transferal is effected is the blood circulation, that is to say, metastasis, to the exclusion of the optic nerve. Such theories are based upon anaphylaxis and tuberculosis. Both are vulnerable in many respects and neither of these theories is capable of adequately answering the three questions enumerated. The possibility of metastasis between the two eyes, in my opinion, is utterly doubtful, for as yet no one has seen a bilateral sarcoma of the choroid, although the latter has just as great an affinity for the uvea of the fellow eye as has sympathetic ophthalmia.

Conclusions

Spontaneous serous iritis and sympathetic ophthalmia are identical affections. Both are seasonal ailments, and the common causative agents are lodged in the nose.

Injury, operation, likewise tuberculosis and syphilis only serve to prepare in the uvea a site of lowered resistance.

Bul. Reg. Ferdinand 10.

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NOTES, CASES, INSTRUMENTS

A SURGICAL OPHTHALMOSCOPE*

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In the recent literature on surgical treatment of retinal detachment, the expression "under ophthalmoscopic control" is often seen. Although this expression has not been defined, it apparently means that the fundus is observed repeatedly during the operation. In the attempt to occlude or seclude the retinal tear, the surgeon makes some kind of mark in the eye through the sclera, then looks in with the ophthalmoscope to find the accuracy of his aim. Safar pins were used in an early marking method; the newest technique is to form hydrogen bubbles in the vitreous at the site of a cathode needle. The position of the bubbles in relation to the retinal tear indicates where the next puncture should be placed.

Although such a procedure is an improvement over former technique, it still is no more than a trial-and-error method. Furthermore, the use of the ophthalmoscope at the operating table has not been altogether satisfactory, for aseptic technique is difficult to maintain and the time of operation is greatly extended.

In order to overcome these difficulties the writer has designed a small ophthalmoscope that is clamped upon the surgeon's glasses. It will fit on any type of mounting and over either eye. A fine wire clipped to the surgeon's cap carries the current. A mere head-band to support the ophthalmoscope is not satisfactory; the instrument must become a more intimate part of the act of seeing, and the glasses' mounting seems to be best.

In use the instrument fits over one eye, as is shown in the illustration. The clamp lies diagonally across the glass, leaving the lower inner half of the field (including bifocal segment) unobscured. Ophthalmoscopy is performed by gazing above the clamp. Careful adjustment, which is essential, should be carried out with the patient on the table. At this time the proper focusing lens is determined and clipped into place. Variations in focus during the operation are made by moving the head closer to or farther from the field of operation.

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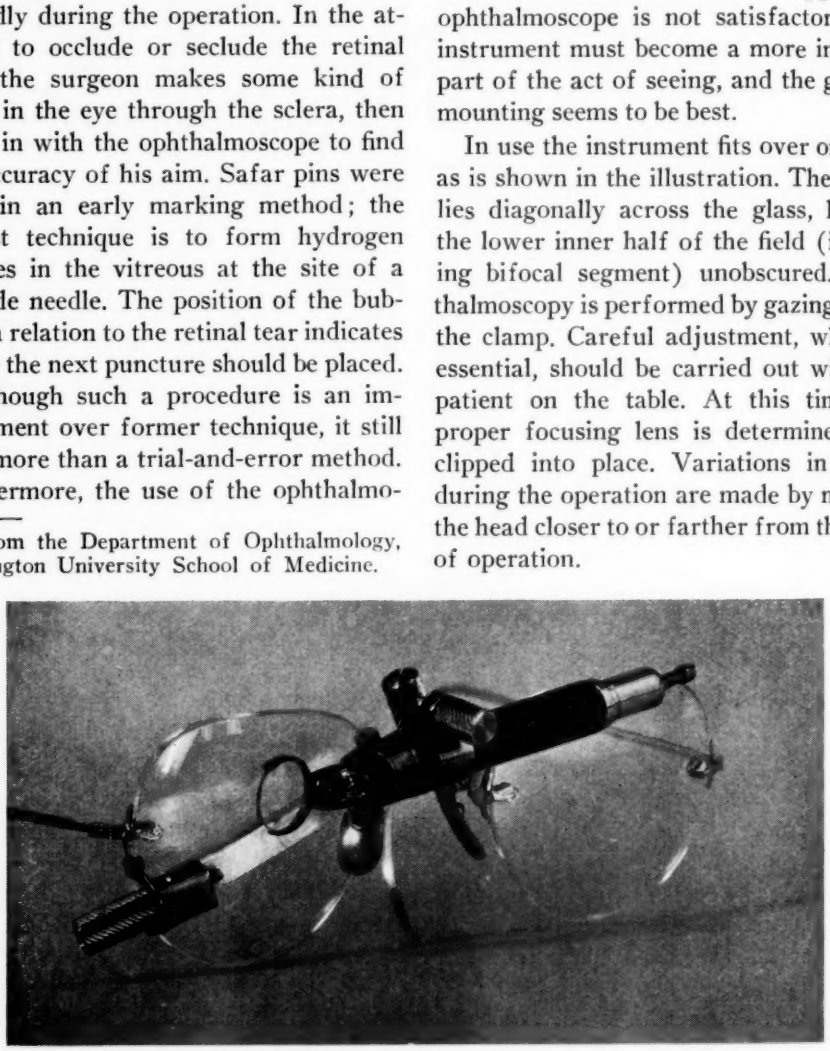

Fig. 1 (Hildreth). Surgical ophthalmoscope.

The writer has been using this instrument for several months in the laboratory. With rabbits one can work inside the eye, guiding his movements by direct observation. In human subjects a fine needle is passed through the sclera and is easily seen shining through the retina. The point of the needle is guided into the tear and the galvanic current applied. The needle is clearly seen throughout the procedure.

Needless to say, the cornea requires the greatest of care; saline must be applied every few moments and anesthesia must be obtained without cocaine. When correct, the adjustment of the ophthalmoscope will not change, for it is rigidly clamped, but a certain amount of practice is necessary before one becomes accustomed to the use of the instrument.

This presentation of the ophthalmoscope will serve as an introduction to reports on experimental work on retinal detachment that is now in progress. Although the writer has had no occasion to use the ophthalmoscope on a case of vitreous foreign body, it quite possibly may be useful in some instances.

The ophthalmoscope is manufactured by the Bausch and Lomb Optical Company. The illuminating part of the instrument is composed of the May lens system and prism. The author's model was made by Mr. William Fuchs, in charge of the departmental machine shop.

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EXCISION OF CHALAZIAL SAC THROUGH CONJUNCTIVAL INCISION

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It is a common experience to find that, some time after the evacuation of the contents of certain chalazia, there develops a slight lump which is disturbing to the patient and which he interprets as incomplete work on the part of the surgeon. This residual lump may occur even when the chalazion has been completely evacuated and its walls curetted. It is more likely to occur when the chalazion has been present for several months and when the contents are thick and gelatinous. Under these conditions the sac wall, because of long-continued low-grade inflammation, has undergone fibrous thickening which cannot be obliterated by any amount of curettage.

I am indebted to Dr. Carl Beisbarth for the suggestion that, immediately after evacuation and curettage, it is easily possible to dissect out the sac through the crisscross opening into the tarsus. The bottom of the sac is picked up with a sharp-toothed forceps, drawn forward, and while thus partially everted, is dissected out with fine sharp-pointed scissors. The results of this little modification have been gratifying. After healing there is no palpable nor visible trace of the former chalazion.

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CHANGES IN THE INTRAOCULAR TENSION DUE TO THE CIRCULATION OF THE AQUEOUS IN THE CILIARY BODY*

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Friedenwald and Pierce† demonstrated by animal experiments that "vasocongestion of the iris and pericorneal vessels, due to venous stasis, to increased arterial pressure, and to vasomotor reflex from corneal and conjunctival irritation, and from injection of histamin into the anterior chamber, increases the rate of reab-

* From the Laboratory of St. John's Hospital.

† Friedenwald, J. S. and Pierce, H. F. Circulation of the aqueous. Arch. of Ophth., 1932. v. 8, July, p. 9.

sorption of the aqueous, and tends to lower the intraocular pressure, thus balancing and compensating for the increased rate of formation of aqueous, which results from the same stimuli." They also demonstrated, that "the reabsorption of aqueous occurs almost exclusively from the anterior chamber."

To explain these phenomena they formulated a simple hypothesis "which accounts mechanically for these features of the mechanism of reabsorption of the aqueous."

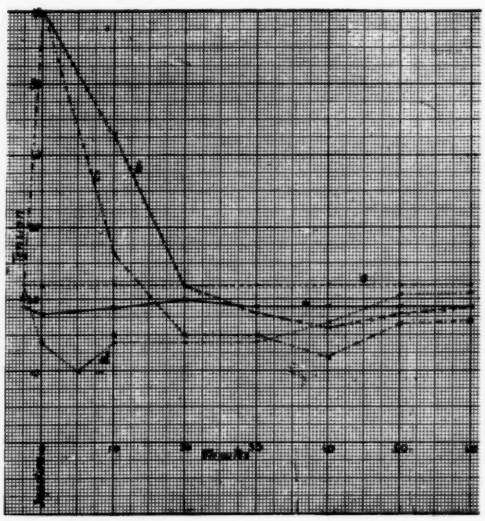

Fig. 1

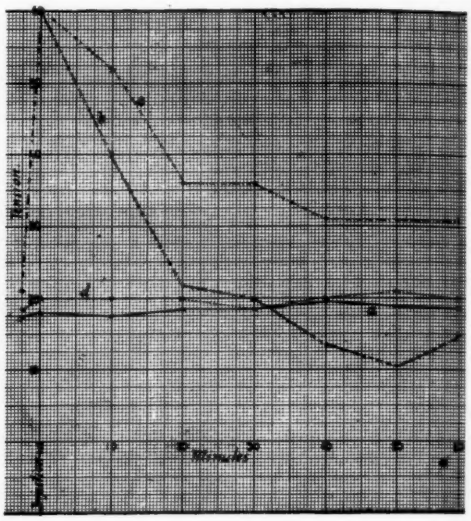

Fig. 2

Fig. 1 (Hůlka). Injections of aqueous. a, subconjunctival; b, into the anterior chamber; c, into the ciliary body; d, into the carotid artery; e, injection of second aqueous into the carotid artery. Each of the curves, except e, represents the average measurements of intraocular tension in two identical experiments on two rabbits.

Fig. 2 (Hůlka). Injections of normal salt solution. a, subconjunctival; b, into the anterior chamber; c, into the ciliary body; d, into the carotid artery. Each curve represents the average measurements of intraocular tension in two identical experiments on two rabbits.

The venous circulation of the iris is in direct communication with the arteriovenous circulation of the ciliary body—a region which evidently is the main source of aqueous production. The question arises whether aqueous, after being absorbed by the iris and reaching the ciliary body, has any influence on the rate or amount of production of new aqueous.

To clarify this point, a series of experiments was performed on rabbits, the tension being measured by the Schiötz tonometer. The cornea was anesthetized with 4-percent cocaine containing no adrenalin. Experiments in which the carotid artery had to be exposed were performed on rabbits anesthetized with ether. In taking the tension with an ordinary clinical instrument, certain precautions had to be observed to avoid variations of tension due to the retraction of the eyelids or to the fixation of the eyeball. Using standard technique, variations of tension on repeated measurements did not amount to more than 1-3 mm. Hg (Schiötz).

The experiments are summarized in graphs 1 and 2. Each curve of these graphs represents an average of two identical experiments performed on two rabbits. A large number of identical experiments should have been performed to exclude

variations due to the technique, to the initial tension, and other factors, but time and material were limited. Nevertheless, both curves in each of the identical experiments demonstrate the same general characteristics and the same relative position to the curves of the other experiments, so that conclusions may be formed with a fair amount of certainty.

Curves marked *a* in graphs 1 and 2 represent subconjunctival injections. Curve *a* in graph 1 is a record of the injection of 0.2 c.c. of aqueous withdrawn from the anterior chamber of one eye and injected under the limbal conjunctiva of the other eye. This experiment performed twice on two different rabbits failed to change the intraocular tension. A similar experiment is recorded in graph 2, except that 0.2 c.c. of normal salt solution was used instead of the aqueous. No change of tension resulted.

Curves marked *b* in graphs 1 and 2 represent injections into the anterior chamber. Curve *b* in graph 1 is a record of the injection of 0.25 c.c. of aqueous withdrawn from the anterior chamber of one eye and injected into the anterior chamber of the other eye. This experiment performed twice on two different rabbits gave a curve which, in general characteristics, is similar to the corresponding curve of graph 2, in which an equal amount of salt solution was used instead of the aqueous.

Curves marked *c* in graphs 1 and 2 represent injections into the ciliary body. Curve *c* in graph 1 is a record of 0.25 c.c. of aqueous withdrawn from the anterior chamber of one eye and injected into the ciliary body of the other through a perilimbal puncture. The experiment performed twice on two different rabbits gave two similar curves, both characterized by a rapid fall of the tension below the tension recorded before the injection. The control experiment, also repeated on two rabbits but performed with normal salt solution, gave curve *c* of graph 2, in which the tension stayed higher than that recorded before the experiment and the increase still persisted one hour after the injection.

Curves marked *d* in graphs 1 and 2 represent injections into the carotid artery. Curve *d* in graph 1 is a record of the injection of 1 c.c. of aqueous withdrawn from several rabbits and pooled. The fluid was kept on ice for several days before it was used in the experiment. The curve shows a rapid fall of the tension within about five minutes with gradual recovery within one hour. This experiment was repeated on another rabbit with similar results. Two control experiments with salt solution are recorded by curve *d* of graph 2. There was no appreciable change in the tension from the normal.

When the aqueous was collected for the carotid injections, the anterior chambers were emptied again after they had refilled and the so-called "second aqueous" was collected and kept separately. A fibrinous sediment formed in the sterile vial; the supernatant fluid, about 0.8 c.c., was then collected and injected into the carotid artery of one rabbit. It caused no change in tension as recorded by curve *e* of graph 1. These observations would indicate that an increased amount of aqueous, carried into the ciliary body either by direct injection or by the carotid artery, decreases the intraocular tension.

A hypothesis might be advanced that the aqueous contains a hormone which, when it reaches the ciliary body, decreases the production of new aqueous and thus lowers the intraocular tension.

With such a hypothesis in view a second series of experiments was performed. A large amount of aqueous was collected from fresh bovine eyes obtained at a slaughter house, and two rabbits were injected with it intravenously, 6 c.c. of aque-

ous being used in each experiment. The injections failed to change the intraocular tension. Two other rabbits were injected intravenously with an aqueous extract from bovine ciliary bodies with no resulting change of tension. Another extract from bovine ciliary bodies was prepared, following a method used in the preparation of adrenal extract, as given in the U. S. Pharmacopoeia, also with a negative result after intravenous injection. In three other experiments, ground bovine lenses were extracted with hot n/10 HCl and neutralized extract injected intravenously. Two injections produced increased tension, one failed to show any effect. Neutralization was performed against litmus paper separately for each injection and a different amount of coagulate was filtered off in each experiment.

These experiments are offered as a suggestion to biochemists. No definite conclusion is drawn from them because a better technique might have been used for measuring the tension if proper laboratory equipment had been available, moreover larger experimental material might lead to more definitive conclusions.

A search through the literature revealed no attempts to investigate the existence of intraocular hormones.

Summary

Homogeneous (rabbit's) aqueous, brought into the circulation of the ciliary body of the rabbit decreased the intraocular tension. A large volume of heterogeneous (bovine) aqueous had no similar effect when injected intravenously into a rabbit. Extract from bovine ciliary bodies injected intravenously did not alter the intraocular tension of the rabbit. Extract from bovine lenses, injected into the rabbit's veins increased the intraocular tension in two experiments, but had no effect in a third. Further investigation of the existence of intraocular hormones is suggested.

30-28 Thirty-Sixth Street.

SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

SAINT LOUIS OPHTHALMIC SOCIETY

October 15, 1936

Dr. Carl T. Eber, *president*

Retinal detachment

Dr. W. E. Shahan read a paper on this subject which will be published in this Journal.

Discussion. Dr. John Green stated that at about the time Dr. Shahan was performing his operation, he was doing another similar to it. The patient, a woman, 72 years old, had a detachment below. After a few days in the hospital he laid back the conjunctival flap over the site of the detachment, made three trephine holes in the sclera, and then applied the thermophore at 153 degrees. Then with a Graefe knife he allowed the subretinal fluid to escape. He had not reported this case because the patient died at the end of a week from an embolism, but, at any rate, the progress up to that time had been satisfactory and he was sure the retina had become reattached.

Dr. J. M. Keller mentioned that in the literature several deaths had been reported in older patients who had been confined to bed for any length of time. Death occurs, in these cases, not of cerebral hemorrhage, but of embolism.

Dr. L. T. Post said that he believed it wise to use pupil glasses for about 3 months after the operation. Dr. Clifford Walker recommends them for about a year after the operation. He had tried the combination of diathermy and galvanism about 12 days ago. This case showed an interesting feature. The tear was in the upper part and not elevated to any great extent from the choroid, but there was an extensive detachment below. It is essential that the tear in the upper part be closed. He used about 24 pins and then introduced a needle for galvanic current. Nothing was done to the detachment below except to evacuate the fluid with a scleral puncture. Dr. Post said that he keeps the patients in bed, blindfolded, for about two weeks, according to whether they have an upper or lower detachment.

Dr. W. E. Shahan, in closing, said that he applied the heat first and performed the sclerotomy afterwards in order to maintain intraocular tension while applying the thermophore. On experiments with rabbits he and Dr. L. T. Post had found that 165 degrees of heat with the thermophore applied to the sclera will destroy the retina in the entire area in which the heat is applied. He believed therefore that it was safer to apply the heat while the retina was held away from the choroid by the subretinal fluid.

Looping the muscle in strabismus (moving pictures)

Dr. F. O. Schwartz read a paper on this subject which will be published in this Journal.

Discussion. Dr. John Green said that operations for increasing the effect of any of the recti muscles may be divided into two classes: (1) those which require a severance of the tendon from its insertion; and (2) those which do not. In the first group the effect is obtained by (a) an advancement of the tendon to a point nearer the cornea, or (b) an advancement combined with a resection of a portion of the tendon, or (c) a simple resection of the tendon, the shortened tendon being sutured to the tendon stump.

In cases of lateral deviation combined

with some degree of vertical deviation it is possible, by suturing the tendon of the rectus to the sclera, either above or below the level of the original insertion, to correct the vertical as well as the lateral deviation.

In the absence of any vertical deviation, an advancement with fixation of the tendon to the sclera may create a postoperative hyperphoria, due to the fact that unintentionally the tendon has been sutured to a point slightly above or below the position of the original insertion. This accidental by-effect is almost certainly avoided if the tendon is resected and sutured directly to the tendon stump.

These possibilities, however, he thought, need not much concern us when we are trying to straighten an eye with a high degree of amblyopia, for even if the placement of the scleral suture is faulty the vertical deviation is slight and the cosmetic result is satisfactory.

Whenever it is important to avoid the creation of hyperphoria, surgeons have generally preferred some form of operation which did not require a severance of the tendon. Thus have been developed various tucking operations; much ingenuity has been displayed in the designing of instruments for this purpose. An entirely new principle was introduced by O'Connor whose "cinch" operation has the advantage of minimizing the pull on the tendon. By the use of a varying number of strands of dermal suture the amount of shortening can be gauged with great precision. It seems likely that O'Connor's method, or possibly some modification of it embodying a similar principle, will continue to remain the operation of choice on the vertical recti.

Dr. Schwartz's ingenious looping operation provides an effective means of shortening an ocular muscle without disturbing the insertion. The placement of the sutures is such that there is little likelihood of strangulation of the tissues: hence possible necrosis is avoided. The threading of the sutures through relatively rigid gold plates insures that the sutures will remain in the position in which they were originally placed.

Whether an operation be advancement, recession, tucking, the cinch operation, or looping we should not forget the dictum first enunciated by Curdy and accepted by Berens and others; namely, that the amount in millimeters of shortening of one muscle should be equal to the amount in millimeters of recession of the opponent.

H. Rommel Hildreth,
Editor.

COLORADO OPHTHALMOLOGICAL SOCIETY

October 17, 1936

DR. V. H. BROBECK, *presiding*

GONORRHEAL OPHTHALMIA

DR. V. H. BROBECK presented Miss F. L., aged 54 years, who had developed gonorrheal ophthalmia in March, 1936. She was first seen by Dr. Brobeck three weeks following her infection. The usual therapeutic measures had been employed, but in spite of this there had been a massive involvement of the corneae. The corneal involvement was so extensive in both eyes, that there was impending rupture of the globes. Both eyes were operated on by a complete circular incision around the limbus, the conjunctiva drawn over the cornea and held with a purse-string suture. The sutures held for five days and the ulcerated areas were securely covered with epithelium. At the present time the patient can see large objects with the right eye.

Discussion. Dr. William M. Bane inquired whether there was any increase in tension, to which Dr. Brobeck replied that the tension of the right eye was nor-

mal but that of the left slightly elevated.

Dr. George Stine recommended the use of two-percent quinine bisulphate for clearing the corneal opacities and Dr. W. H. Crisp advised the use of one-fourth percent pantocaine before the administration of quinine bisulphate.

Dr. E. M. Marbourg reported the use of steady irrigation with dichloramine-T in a gonorrheal case in which the epithelium of the cornea was hazy and crater-like. Within five days after the institution of this treatment, smears were negative for gonococci.

Ectopia lentis with arachnodactyly

Dr. V. H. Brobeck showed two children from a group of five in one family having prominent physical anomalies seen in arachnodactyly. During infancy these children had been quite normal except for ectopia lentis.

Absence of color vision

Dr. E. M. Marbourg presented Mr. A. P., aged 50 years, who had never been able to distinguish colors. The patient was highly myopic. There is no history of color blindness in the family.

Congenital fibrosis of right optic disc

Dr. E. M. Marbourg presented a colored girl, aged 15 years, in whom the nasal portion of the right disc showed a striated appearance extending over the retina for a short distance. Minute blood vessels were clearly visible in the fibrous tissue. The temporal half of the disc appeared to be normal. The left disc was normal and clean cut. The vision in both eyes was 20/20 and the fields were normal. The condition was differentiated from opaque nerve fibers by the presence of circulation and the absence of the intense white color associated with medullated nerve fibers.

Atrophy of ciliary body

Dr. George H. Stine presented L. S., a youth aged 14 years, who was first seen December, 1935, with a history of an injury to the right eye while sitting on the righthand side of an automobile, with window open, when the car ran into a barbed wire fence. Apparently the wire snapped and whipped into the car window striking him in the right eye. Pain in the eye with severe nosebleed and some vomiting followed. He was not unconscious at any time. When seen shortly after the accident a small skin wound over the outer portion of the right eyebrow was seen with some swelling of the lid and lacrimation. There was considerable ecchymosis and chemosis of the upper and nasal bulbar conjunctiva. The cornea was normal, the anterior chamber deep, but lens and iris were obscured by hyphemia. Vision in the eye was light perception. The tension was slightly minus, and the eye was tender. The patient was given first-aid treatment for the eye and 1500 units of tetanus antitoxin. The treatment consisted of atropine, mercurochrome, bandage, and foreign protein. Six days later the conjunctival swelling had subsided and the eye quieted so that two tiny punctate wounds in the upper sclera, about 5 mm. apart and 5 to 6 mm. from the limbus, were visible which were probably due to the barbs on the wire. X-ray examination of the eye for foreign body was negative. The anterior segment gradually cleared, revealing Vossius ring cataract in the anterior capsule of the lens, but the vitreous was very dark, probably due to hemorrhage. This cleared considerably in the course of a few weeks, permitting a good fundus reflex. A cyclitic membrane began to develop behind the upper portion of the lens, and the lens was gradually dislocated upward and forward obliterating the anterior chamber above. As a result of the prolonged con-

tact of the iris and the posterior corneal surface an anterior peripheral synechia at the 12-o'clock position developed. A dense posterior synechia developed below which resisted attempts at rupture by the use of atropine, cocaine, and suprarenin bitartrate. The lens gradually became opaque, and on September 4, 1936, a discission was made with the idea of relieving the pressure of the dislocated and swollen lens on the upper ciliary body. The tension has always been somewhat minus. There was no undue reaction following the discission, and at the present time, the eye shows moderate ciliary and episcleral injection. The tension is slightly minus and the anterior chamber is very deep, although the peripheral anterior synechia above is still holding, and new vessels are appearing on the iris. There are, however, no keratitic precipitates nor cells in the aqueous. There seems to be little question but that the eye is gradually becoming phthisical and probably enucleation will be necessary. Vision at present is ability to see hand movements. The case is presented because of the unusual and serious nature of the injury.

Tabes with normal discs associated with central scotoma

Dr. George H. Stine presented Mrs. J. W. C., aged 55 years, who was first seen in November, 1934. Two attacks of influenza had occurred in 1918 and 1920. Twelve years previously she had had severe convulsions, apparently due to arsenic injection given after a four-plus Wassermann reaction. Following the convulsions her vision had been very poor; she was almost totally blind with partial recovery.

Vision now is ability to count fingers at one-and-one-half meters in each eye, unchanged the past two years. Dr. Neeper saw her during the first attack, and found the vision in the right eye to be 1/120, and in the left eye 1/80.

The right pupil, 4 mm. in diameter, was sluggish to direct and consensual stimulation. The left pupil was 2 mm. across and reacted normally. There was slight edema of the discs with hazy margins. Fields were full to hand movements.

The present findings show little change in pupils or vision. The discs appear to be normal. In the right eye there is an anomaly of vessel distribution: the upper macular artery courses downward through the macula about one-fourth disc diameter below the fovea, which seems displaced upward slightly with regard to the horizontal meridian through the disc. About two disc diameters down and out from the disc there is a patch of opaque striae resembling opaque nerve fibers, at the temporal edge of which a branch of the inferior temporal vein shows white sheathing, the finer terminal branches being practically obliterated. Between disc and macula are a number of faint, white dots, probably postneuritic. The left eye is apparently normal externally, as is the fundus except for two small white dots in the fovea. The patient now has tabetic gait. The blood Wassermann reaction at present is negative, but the patient is still under syphilitic treatment, bismuth and fever therapy. The central scotoma is probably due to cerebral lues; cortical involvement is suspected in as much as the discs appear to be quite normal.

Edna M. Reynolds,
Secretary.

COLLEGE OF PHYSICIANS OF PHILADELPHIA

SECTION ON OPHTHALMOLOGY

November 19, 1936

Dr. Charles R. Heed, *chairman*

Coloboma of the optic nerve and choroid, two cases

Dr. Henry O. Sloane stated that R.

F., a young man, 17 years of age, came to Dr. Harrison's clinic at the Jefferson Hospital, requesting examination. He did not complain of any special symptoms, except that he could not see well with his left eye. He had had no illnesses, except the usual ones of childhood, but had misplaced knee caps. The family history was negative. The right eye showed no abnormalities either externally or internally; vision was 20/15.

In the left eye there was a coloboma of the iris, complete in its lower sector, extending between the 5- and 7-o'clock position, and about 4 mm. wide, somewhat pear shaped. There appeared to be a few faint opacities on the anterior capsule of the lens, opposite the site of the coloboma. The media were otherwise clear. The optic disc appeared to be oval, well defined and of good color, with a pigment ring on the nasal side. Just below the papilla, and occupying almost the same amount of space, was an excavation of the optic-nerve sheath which extended to a depth of about three diopters. A small retinal artery was seen coming down from the center of the papilla and dipping into this excavation. There was also a cilioretinal vessel which looped around the lower temporal edge. Lying deep in the excavation there could be seen what appeared to be the central retinal vein and artery. This coming forward and upward, crossed the edge of the excavation and continued downward over the lower retina. The color of this excavation was much paler than the papilla above it. It was of a grayish blue, and had sloping edges.

About two disc diameters below the edge of the excavation of the optic-nerve sheath there was a large coloboma of the retina and choroid. It extended in a wide semi-elliptical shape as far down as one could see. Surrounding the upper margin of this coloboma was an area of dense pigmentation; extending down for about one-half disc diameter was a much thinner deposit of pigment, brownish in color. The coloboma itself was of a pearly-white color. No ridges could be detected in it. Several of the retinal vessels coursed over the region, and there also appeared to be one of the choroidal vessels on the temporal side. Otherwise, there was a complete absence of tissue, so that the sclera was exposed.

Central vision was 20/40 corrected with —.75 D.sph. ⊂⊃ +1.50 D.cyl. ax. 45°. The field was only partially contracted above and did not extend to the same extent as the size of the coloboma would indicate. This, according to Foster, is true in many cases where the retina has been preserved.

The second case was that of a young woman, Mrs. L. H., aged 32 years, who presented the following condition: The right eye diverged 15 degrees. (She gave a history of having been operated on at the age of 10 years for a strabismus, probably having had a tenotomy of the internal rectus.) She was unable to converge. The ocular rotations were limited somewhat on upward rotation. The left eye converged under cover 10 degrees. Vision in the right eye was limited to counting fingers at one foot, eccentrically. Vision in the left eye with correction was 6/6.

Ophthalmoscopic examination of the right eye showed many fine vitreous opacities. There was also a radiating opacity on the posterior capsule of the lens. The disc could not be seen, but in its place was an excavated area, horizontally oval in shape, of grayish white color. The retinal vessels, which were very much attenuated, dipped over the edges of the excavation and were lost to view. About one disc diameter away from the temporal edge of the disc were two broad, bandlike areas of white tissue, which ex-

tended from about the level of the upper margin of the disc and ran downward in a curved direction for a considerable distance in the retina. There were numerous areas of pigment deposits throughout the retina, extending into the periphery. These assumed various shapes, some being of the bone-corpuscle type, while others radiated in streaks, and still others were clumped together in masses. Several patches of choroiditis were scattered throughout the retina. In the left eye the media were clear and the fundus was healthy. The past history in this case was negative. There was no family history of ocular disturbances. The Wassermann and Kahn tests were negative. This case might be readily diagnosed as one of chorioretinitis with pigmentary changes and extreme contraction of the vessels, of luetic origin. However, the negative serology and the complete absence of any pathology in the left eye militated against this diagnosis. The picture of the optic nerve was that of a coloboma. This was confirmed by Drs. Shannon, LeFever, and several others who saw the case.

Coloboma of the optic nerve itself is very rare, according to most authorities; usually the coloboma is of the optic-nerve sheath. In the latter condition the papilla is enlarged three or four times the normal size. In both of these cases the papillae were only slightly enlarged. However, in one there was a definite depression below the papilla. This appeared almost like an excavation and measured about three diopters.

As to the etiology of these cases, it is usually conceded that the maldevelopment is due to failure of the ocular fetal cleft to close properly. Heredity plays a rôle also, although in both the cases no history of hereditary disease was present. Coloboma of the iris, choroid, and retina as well as other developmental defects may be present, as was the case in the first patient.

Coloboma of the iris was, according to Folk, met with in 198 of 477,200 children; it was bilateral in 37 cases, occurred in the right eye 66 times, and in the left 95 times. According to Waardenburg, the predisposition to coloboma of the iris is on the whole a dominant hereditary characteristic, but in certain instances it is recessive. Familial occurrences have been reported by Streatfield, DeBeck, and Snell. In each family it passed through several generations.

Discussion. Dr. William Zentmayer said that Folk had recently reported the histologic findings in a case of coloboma of the choroid and optic-nerve entrance. There was entire absence of the choroid and the pigment epithelium of the retina. The remaining layers of the retina were present but malformed. There was no evidence of inflammation nor mesodermal strands. The defect about the papilla was found outside of the nerve proper. Dr. Sloane's patient appeared to have skeletal anomalies. His legs were unduly long and his fingers somewhat of the arachnodactylic type. It is of interest that about a year ago Sorsby reported a family several members of which had macular coloboma with skeletal anomalies. The ocular and osseous changes are probably due to some fault in the mesodermal anlage.

Dr. Sloane, in answering Dr. Burton Chance, said the statement regarding the liability of these eyes to disease was a quotation from Dr. Hird's series of cases. He personally had not seen many of these cases, but these few had shown no inflammation.

Interrelation of cutaneous and ocular diseases

Dr. Joseph V. Klauder projected lantern slides of cutaneous diseases that at times present ocular lesions.

A. G. Fewell,
Clerk.

ROYAL SOCIETY OF MEDICINE, LONDON

SECTION OF OPHTHALMOLOGY
November 13, 1936

MR. W. H. MCMULLEN, *president*

RETINAL AND FUNDAL HEMORRHAGES IN THE NEWBORN

DR. FRANCES RICHMAN, New York, said that the contribution was based on an ophthalmoscopic study of 531 newly born infants when they were between one day and eight days old. The study included the obstetrical data concerning each mother.

New aspects had now arisen which pointed to the necessity of far more work being done on the subject. For example, speculations cropped up regarding the relationship between retinal hemorrhages and congenital amblyopia, and between macular hemorrhages and squint. Only after the examination of large numbers of infants, extending over a considerable time, said Dr. Richman, could sufficient facts emerge to convert speculation into certainty.

Amazing differences were seen in the normal fundi of the newborn, and also as compared with the normal adult fundus. The discs, for example, showed many variations. At least six groups could be distinguished, each having special characteristics. The most common was a disc of medium size, having well-marked pigment ring, either complete or partial. The same sized disc without the pigment border was next in order of frequency. A large or small cup might be present in any type of disc. Two of the types found bore a strong resemblance to the adult myopic disc: one of them had a scleral ring round it, the other had a pigmented crescent.

The color of the disc deserved special mention; a peculiar grayish tinge was definitely apparent in the disc of every newborn baby, and was quite normal. The practical application of this fact was seen when an opinion was required as to the vision of a young infant. Here, in these cases, in spite of the gray color of the disc, a good prognosis could be safely made.

The absence of choroidal tessellation in the normal infant's fundus was quite striking. The child's fundus is either diffusely red, with no choroidal details showing, or it is light colored with a network of choroidal vessels visible throughout. The macular area is always of a deeper red than the rest of the field. Normally, the foveal reflex is not seen, and the macula itself is only localized by its relationship to the disc.

The hemorrhages seen were of three main types: flame-shaped extravasations in the nerve-fiber layer were most common and the least damaging, the reason probably being that these were most quickly absorbed. Dull red, diffusely round hemorrhages lay in the deeper layers of the retina, and might persist for ten days, or even longer. Those which lasted the longest were preretinal collections of fluid blood, very dark red, and circumscribed, having a tiny reflex at the summit from the light of the ophthalmoscope.

The macula might have a hemorrhage almost exactly resembling a "hole in the macula" of traumatic origin. Sometimes the disc also was involved. In these cases it was impossible for the observer to say how much hemorrhage had occurred along the fibers farther back, or how much damage had been suffered by the sensitive papulo-macular bundle in its course to the macula.

The popular idea that retinal hemorrhages occur in direct relationship to the length of the severity of the labor was upset by this research. In the graph, built on the series of cases, and exhibited, the hemorrhage curve conformed exactly with the

birth curve; it was unaffected by the duration of the labor. Dr. Juler found the same to be true in the cases he inquired into ten years ago.

The incidences of hemorrhages in the entire group of 531 babies was 12.2 percent. First-born babies showed 17.5 percent, as compared with 9.2 percent in subsequent babies. But first-borns delivered with forceps ran up to 20.6 percent, as against 13.8 percent in first-born spontaneous deliveries.

One important factor was the time elapsing after birth at which the examination was made. In a series being examined by the speaker in London at the present time, at Queen Charlotte Lying-in-Hospital, the incidence was rather higher than that according to New York figures, probably because the examinations were made within 24 hours of birth; that is, before any absorption of hemorrhage had had time to take place. Every infant is entitled to have an examination of the eyes at birth, as a routine procedure.

Discussion. Mr. Frank Juler said that he had had the privilege of doing some work on the same subject at the same hospital, Queen Charlotte's, ten years ago, and it was interesting to hear the results of that work endorsed in 1936 by figures from New York, for hemorrhages occurred in almost the same proportion in the two sets of figures. In some cases hemorrhages which were very evident 24 hours after birth had disappeared when the infants were examined from four to seven days after birth; they vanished very quickly, and that was especially true of the flamelike hemorrhages. The round clotlike hemorrhages took longer to disappear. The point Dr. Richman made about being able to distinguish the level of the hemorrhage in the retina was a new one to him. He had seen these round clots in the macular region, and was not sure whether they were in the retina or in front. He thought they were at the preretinal level. It seemed definitely true that there was no relationship between the onset of the hemorrhage and the duration of severity of the labor. He had put forward the idea that the incidence might be merely due to some local anatomical change in the different orbits, that it might depend on the connection between the central retinal vein and the cavernous sinus, whether the retinal vein went straight into the ophthalmic vein with very few lateral anastomoses. In some of the cases there was great intracranial pressure, in others this was not true. If there was much anastomosis between those and the extracranial venus channels, there was less liability to hemorrhage. There seemed to be general agreement on the point that retinal hemorrhages must be due to intracranial pressure at birth. He had seen 19 fundi in babies born by Caesarean section before labor had started, and none of them showed hemorrhage. One often saw clinical cases of amblyopia from squint or otherwise in cases of macular change of obscure origin in children, and one was inclined to attribute it to hemorrhage at birth.

Miss Ida Mann said, in regard to the gray color due to myelination spreading from behind forwards, that this was often suggestive of some sort of optic atrophy. She was now convinced, with Dr. Richman, that it was the normal color of the disc. One of the discs shown had a scleral ring, and it would be interesting to know whether what it suggested was a myopic type of disc, or whether the children were myopic at birth. If a child was not myopic and had that type of disc, the theory of stretching was not borne out. Questions such as these arise, and observations of infants' fundi will help knowledge as to whether certain discs are connected with certain types of refrac-

tion: also whether there is a means of distinguishing congenital abnormalities from cases of traumatism.

Mr. Leighton Davies said he thought one could not leave out of account the effect which the tying of the umbilical cord must have in the causation of these hemorrhages: it certainly made a great difference in the venous circulation.

Mr. Somercille-Large asked whether Dr. Richman had found the hemorrhages extended to the periphery in any of her cases? Had she examined the fundi, under a mydriatic, as far as the periphery of the retina?

Dr. Richman replied that she had used one-half percent homatropine solution for instillation into the eyes, doing this twice with half-an-hour interval. She had tried atropine and other mydriatics, but they were no more effective. Solutions of adrenalin were discontinued because they caused wheals to appear on the infants' skin. In some instances the hemorrhage had extended as far into the periphery as one could see. All questions of etiology and technique would be discussed in a full paper to be published.

Dysostosis cranio-facialis

Mr. A. J. Ballantyne (Glasgow) said that to the ophthalmic surgeon the interest of these cases lay principally in the ocular complications, these taking the form, chiefly, of optic neuritis, optic atrophy, and forward displacement or dislocation of the eyeballs. The case described in this paper appeared to belong to the group hereditary cranio-facial dysostosis, or Crouzon's disease.

The patient, a boy four months old, was said to have had a head deformity ever since birth, and the head had increased in size. From earliest days the eyes had shown a tendency to come forward in front of the eyelids when the child cried, and in the last few days the left eye could not be replaced behind the lids. When the boy was seen by him both eyes were very prominent. In the right eye the sclera was exposed almost to the equator, and the eye could easily be dislocated in front of the lids; but it also could be easily replaced. The left eye, however, was found dislocated in front of the eyelids and could not be replaced. In the right eye there was a coloboma of the iris, downward and slightly inward. As the left eye was not protected by the lids, the cornea was cloudy, pus was present in the anterior chamber, and the lower part of the iris could not be clearly seen. As the left eye could not be saved, it was excised, under general anesthesia. In the right eye moderate papilledema was present.

On sectioning the eye which was removed, Dr. Ballantyne found that the retina, choroid, and ciliary body were normal, showing the characters of the infantile eye, pigment being present in the retinal epithelium and in the retinal layers of the ciliary body, but was practically absent from the stroma of the choroid. In the cornea, necrosis was indicated by absence of nuclear staining from the anterior half, and at the margin of the cornea this necrotic portion had begun to separate from the posterior half of the cornea, and epithelium was growing in from the limbus to cover the latter. The anterior chamber contained a good deal of fibrinous exudate with polymorphonuclear leucocytes, and similar cells were numerous in the iris and in the pectinate ligament at the angle of the anterior chamber. The boy's mental capacity placed him in the imbecile category. There was a marked proptosis of the right eye, but it could be completely closed in the effort to avoid a strong light or an approaching finger. Vision was sufficient to enable him to distinguish moderately large objects. The head was held in a drooping attitude, as

if the child were suffering from photophobia. The greatest circumference of the head was 22 inches, and the distance between the internal canthi was one-and-one-fourth inches.

The etiology of the condition is, he said, unknown, but Crouzon suggested that the primary lesion in these cases is inflammatory, and that it might result from a local meningitis. There is no evidence that syphilis, tuberculosis, or rickets plays a part in the causation.

The deformity is sometimes present at birth, but in some it may not show itself until the second year of life. At birth the exophthalmos is so extreme that something has to be done to protect the exposed eye. The condition is compatible with normal intelligence, and cases have been known in which the patient lived to be 35, even 60 years of age. Crouzon had seven cases in three generations.

Discussion. Mr. W. H. McMullen said that the description of this case showed the condition to be closely allied to oxycephaly, of which he published an instance many years ago.

Mr. Gray Clegg said that the variations in the vision in certain cases could be related to the size of the optic foramen. Variations in the size of that foramen were found in deformities of the skull. He asked whether radiograms had been taken to show the variations in the diameters of the foramina.

Mr. Ballantyne replied that it was reported that the optic foramen was deformed in these cases, but the speaker had not seen a reference to X-ray photographs having been taken to make a comparison.

A CLINICAL STUDY OF 54 CASES OF OCCLUSION OF THE CENTRAL ARTERY OF THE RETINA AND ITS BRANCHES

MR. J. MINTON stated that this investigation was carried out at the Royal Eye Hospital, London. That hospital's records showed 54 patients who suffered from obstruction or occlusion of the central artery of the retina or its branches in the past six years, and an analysis of them revealed that 48 of the patients were over 50 years of age. Five patients under 40 years had associated valvular disease of the heart. Most of the patients showed evidence of retinal arteriosclerosis. Raehlmann considered that so-called embolism of the central artery of the retina is not due to an importation of a plug from some distant source, and Coats thought that the embolism is the result of endarteritis of the retinal arteries. Thrombosis is a very important factor in these cases, but it must not be regarded as the primary factor. In certain cases embolism is a possible explanation. The investigation showed that the superior temporal branch, alone or in association with the superior nasal branch, was occluded more frequently than any other branch. In two patients occlusion of a branch of the central artery was associated with thrombosis of a tributary of the retinal vein. In a number of the patients, spasm of the retinal arteries was observed. Priestley Smith suggested, in 1913, that prolonged spasm of the central retinal artery is responsible for some cases of temporary or permanent blindness. The clinical and experimental evidence point to the fact that angiospasm may, in many cases, precipitate the onset of occlusion of the diseased retinal arteries. Twenty-seven of the patients were now alive, in several cases many years after the onset of the occlusion; 14 of the patients were dead, but several of these latter lived for a number of years after the occlusion commenced.

As to treatment, iridectomy had been done for embolism of the central artery of the retina in 1884, and at that time Priestley Smith discussed paracentesis as a treatment. In cases of genuine spasm

this was successful. In cases of transient blindness recovery took place spontaneously.

Discussion. Mr. T. Harrison Butler spoke of a patient of his, a master at a large public school, who said he had been liable to transient attacks of blindness, lasting 15 to 20 minutes, for some thirty years, on and off. But more recently he had suffered what he described as obfuscations of the mental processes, so that for two or three seconds he "lost himself." If an artery were really thrombosed he did not see how it could become normal again in a short time. In some cases of obstruction one could see, after a day or two, detached portions of clot wandering about, and the circulation was reestablished, though the sight might not come back. Spasm seemed to him to be a far more likely explanation than anything more organic, and spasm was, he thought, more frequent than it was generally supposed to be.

Sir John Parsons asked whether any member had tried acetylcholine in any number of cases. He had tried it in one case, but the result was not very good. It seemed a reasonable method of treatment.

Mr. F. T. Ridley remarked that a rare event was that it could follow a blow on the head. An apparently normal girl had a typical lesion after severely striking her head on a telephone bracket.

Mr. Humphrey Neame said that paracentesis was worth trying in these cases, in spite of the liability of the embolus to shift. He had a man, over 60 years of age, who, six months before, had lost the sight of one eye, and the other eye had this symptom. Within 24 hours of his coming to the hospital the speaker performed paracentesis, and in 48 hours vision had returned to 6/12. He tried acetylcholine for a woman 48 hours after the onset, and no benefit took place.

Mr. Ransom Pickard said that obviously acetylcholine will not be good except in cases of spasm; there may be a number of attacks before the onset of permanent blindness. That is analogous with what takes place in the brain, as shown by the occurrence of temporary aphasia or temporary hemiplegia.

(Reported by H. Dickinson).

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CONGENITAL BLINDNESS

This might be thought of as out of the field of preventive medicine. But the rapidly increasing field of prevention has already included it. It has been known for years that the most common cause of congenital cataract was syphilis. Recently it has been shown that specific treatment during the early months of pregnancy is effective in preventing it and that treatment during infancy prevents interstitial keratitis.

Vitamin deficiencies have been shown to be the common cause of epidemic blindness and keratomalacia. The experiment of withholding vitamin A from breeding sows, reported in this Journal, 1935, p. 1087, from the Texas Agricultural Experiment Station, showed forty-two blind pigs, many without any eyes whatever. Genetic control tests showed that this congenital blindness was due to the lack of vitamin A. The same animals, liberally supplied with this vitamin, produced normal-sighted pigs. These results of careful, scientific experiment suggest the importance of a study of the mother's nutrition and diet during pregnancy, especially with regard to the supply of vitamin A. Where one child has been born blind, every possible means should be used to remedy any dietetic fault, to prevent a possibility of the defect in other children. It is entirely possible that certain predispositions to defects that have been ascribed to race may be due to racial customs and habits of feeding.

In a paper on the "Toxic effect of

quinine on the eye," published by Richardson in the Southern Medical Journal for December, 1936, are reported two cases in which the drug had been taken by the mother for malarial disease during pregnancy. One was of a girl completely blind from birth, with a very white optic-nerve head, markedly contracted blood vessels, and dilated, fixed pupils. The mother had been given 30 to 40 grains daily for some weeks, from the seventh to the ninth month of pregnancy.

A boy of five-and-one-half months was brought for nystagmus and dilated pupils, with optic-nerve heads paler than normal, retinal vessels greatly attenuated, and some of the arteries obliterated and replaced by white lines. He appeared to have some vision. Wassermann tests were negative, and no other contributing factor was found. On the afternoon preceding his birth, the mother had been given 30 grains of quinine sulphate, which caused in her marked tinnitis, but no disturbance of vision. Wassermann tests were negative for both parents.

A third child, a girl of 15 months, had been given 8 grains daily of quinine bisulphate for two weeks, for chills and fever, when it was noticed that she could not see. The pupils were dilated, the nerve heads very white, and the vessels greatly narrowed. Later this child regained some sight, with fields of vision markedly narrowed.

It must be remembered in this connection that arsenicals are used with quinine in the treatment of malaria and that some of the reported cases of toxic amblyopia have occurred after such treatment. These have pursued a course suggestive of arsenical poisoning. This should be remembered in treating the pregnant woman for the prevention of congenital syphilitic disease. The best-established branch of preventive medicine is the withholding of drugs that may be responsible for unfavorable symptoms. In this regard the influence of a personal idiosyncrasy to a certain drug must also be considered and watched for. It is better to fail to cure than to make the patient positively and permanently worse, by medication, that may do no harm to other patients. Congenital blindness is rare, but on that account we should be reminded of its avoidable causes. We are learning that, in general, prevention is better than cure, and more often complete.

Edward Jackson.

RETINAL SPASM

The phenomenon which we know as "spasm" is little understood. It affects voluntary and involuntary muscles. In the former it is a violent and involuntary contraction. In the latter it is a violent contraction beyond that called for by normal function. It is sometimes due to irritation, as in spasm of the muscle wall of the colon or stomach. Occasionally, as in spasm of the leg muscles, it appears to be due to a sudden call for contraction in a resting or quiet part. Or it may be due to fatigue, when conceivably it may arise from combination of irritation by fatigue toxins with exhaustion of the normal mechanism of nerve regulation.

It is possible that muscle spasm is the basis of many obscure symptoms in deep organs or tissues; and especially is it probable that a spasm of the muscular coat of the arteries is often responsible for pain as well as for more destructive effects. Spasm in the arteries of the brain is blamed for a variety of conditions, including fugitive paralyses, attacks of vertigo, and various more or less apoplectic seizures involving loss of central control of special functions.

To a large extent the manifestations of vascular spasm are distinguished from primarily organic seizures by the fact that

in the former the symptoms clear up in a brief period. But the deleterious effects of vascular spasm are sometimes partly or wholly permanent.

The accessibility of the retinal circulation to examination with the ophthalmoscope might suggest that vascular spasm should have been very effectively studied in the eye. But Sédan and Jayle point out that this is far from being the case (Annales d'Oculistique, 1936, volume 173, pages 609 and 865, and 1937, volume 174, page 73; total of 78 pages with long bibliography).

It has been argued that retinal spasm was blamed for a number of conditions whose cause was quite different. On the other hand, we may have made the mistake of locating in the brain the basis of visual disturbances which really arise in the retina.

Sédan and Jayle group their exhaustive review of the literature of retinal spasm under three types; namely, the recurrent, the prolonged, and the mixed type. Among the recurrent they include certain scotomata, amblyopias (including retinal migraines), and attacks of blindness.

The ocular fundus is hardly ever examined in the course of an attack of retinal migraine. Genet had the exceptional opportunity of studying a patient in whom, during such an attack, the arteries of one eye were apparently reduced to fine red lines. The veins also showed reduction in caliber, but not uniformly. In the course of a few minutes after, but not necessarily because of, inhalation of nitrite of amyl, the arteries visibly returned to their normal caliber, but restoration of vision occurred rather more slowly. This and similar experiences must not be taken as contradicting the accepted fact that in ocular migraine the vascular spasm is more usually intracranial.

General survey of the recurrent type of retinal spasm, including such attacks in the course of general vascular hypertension, leads Sédan and his collaborator to state that this type of spasm is always symptomatic, that its evolution is generally favorable, and that it may occur in healthy or diseased arteries, and in hypertension or hypotension or normal tension, and that only exceptionally does it lead to complications. It is, however, an unquestioned fact that localized arteritis may be the basis of a spasm.

It has been stated that blindness of retinal origin is always incomplete in its transitory form, whereas blindness from cerebral angiospasm is always total. But Sédan and Jayle insist that this statement is too absolute, and that there are cases of transitory and complete blindness, binocular or bilateral, from migrainous spasm of the retinal arteries.

Cases of bilateral blindness of peripheral origin have been studied ophthalmoscopically (to mention only the French literature of the last few years) by Valude and Gallois, Bailliart, Nègre, and Bailliart and Fil. The customary attribution of such cases to a cerebral basis is explained by the fact that the patient is seldom examined during the attack.

Nègre's case was unique in that the retinal arteries showed a doubling of normal diameter which progressed slowly along the vessels from the disc toward the periphery, leaving behind it a filiform contraction, absolutely white and exsanguinated. The case was thus not one of simple blocking of the vessels, but of dilatation followed by secondary occlusion.

Sédan examined a man of 28 years who had been brought to the hospital on account of extremely severe paroxysms of headache which created a suspicion of organic central disturbance. There had been attacks of pain in the feet. Localizing reflexes were completely absent. Examination of the blood and spinal fluid was negative for syphilis. There had been no

poisoning by alcohol or tobacco. The pupils showed extreme miosis, almost without light reflex. Yet the fundi were examined without excessive difficulty. On both sides, all the retinal arteries were extraordinarily narrow, having the appearance of white lines. At a few points they were somewhat more dilated, especially toward the periphery, and here the blood column appeared fragmented. Dilatation under cocaine instillation was sufficient to permit ophthalmoscopic demonstration that the spasm was absolutely general.

Nitrite of amyl was ordered, but through a mistake was not administered, and the patient died suddenly 12 hours later. An autopsy was not obtained, but the diagnosis made was of transient spasms of the sylvian vessels and vascular spasms of the extremities during the first period, then intense retinal spasms followed by spasms of the meningeal vessels, and finally, as cause of sudden death, a vascular spasm affecting either the coronary arteries or more probably a bulbar artery.

Cuénod and Nataf studied a patient who suffered from sudden and transient attacks varying from amblyopia to complete blindness in the left eye only. The patient was first seen the day after one of these crises, when the vision, the visual fields, and the ophthalmoscopic findings were entirely normal. A few days later the patient came hurrying into the ophthalmologist's office during a further attack. The vision of the affected eye was just beginning to return. Immediate ophthalmoscopic examination showed a moderately pale retina and vessels hardly carrying any blood; but little by little, during the continued examination, the retina recovered its normal appearance.

Especially difficult to explain are prolonged visual disturbances due to or attributed to arterial spasm. The conception of prolonged spasm of a healthy retinal artery seems out of harmony with the findings of physiology. Sédan and Jayle mention, but find difficulty in accepting, the supposition that this prolonged action is due to repetition of the nerve stimulus or to continued influence of sympathicomimetic substances.

Sédan and Jayle do not recognize the validity of the distinction usually made between simple spasm and spasm accompanying arteritis. They feel that the juxtaposition of spasm and arteritis does not necessarily indicate a relationship of cause and effect as between the two symptoms, both of which are often merely parallel phenomena of the same general disturbance. W. H. Crisp.

AMERICAN MEDICINE

The American Foundation has just published a comprehensive report, giving the views of leading doctors and surgeons throughout the country on the present status of American medicine and on the problem of making adequate medical care available to the large part of the population that now fails to get it.

Quoting from an abstract of the book sent out by the Foundation:

"The report—which appears under the title, 'American Medicine: Expert Testimony Out of Court'—summarizes the results of an inquiry to medical men begun by The American Foundation approximately 18 months ago. The doctors—chiefly those that have been in practice 20 years or more—were asked whether they feel that radical change in the present system of medical care is indicated, and, if so, in what directions. There was no questionnaire; the doctors were invited to comment freely upon all relevant points, and they did.

"The report makes no recommendations; but in quotations from thousands of singularly sincere and spontaneous statements it analyzes profoundly and

without reserve the *whole* structure of American medicine, presenting the whole picture—including, as one doctor puts it, 'the back of the house as well as the front.'

" 'American Medicine' is the first public report of The American Foundation Studies in Government since the Foundation entered the domestic field. Its work for the period from 1924 to 1935 was in the field of international law and international relations, and its specific interest in the judicial settlement of international disputes.

"The doctors and surgeons who sent statements (the full list forms an appendix of the report) represent every state, all divisions of medicine, and all types of medical experience.

"A group of 134 medical men associated in a Medical Advisory Committee joins with the Foundation in presenting the report.

"The report falls roughly into two divisions, as follows:

"The first seven sections describe present trends in medical practice and in medical education. They analyze without reserve what is wrong and what is right with American medicine today.

"The last four sections discuss various proposals—social and economic as well as medical—for 'distributing' medical care and lowering its cost, and for organizing medical care and public health services. . . . The much greater space and emphasis given to the discussion of medicine itself is not without significance. Medical scientists do not see any possibility of separating the social and economic aspects of medical care from the quality of medical care itself, as a dominant and controlling factor in all planning."

Obviously the ground covered in this discussion is enormous and it is only possible to comment on some of the most vital points. In answer to the question, "Is adequate medical care now generally available?" the response, though qualified, is "No."

"*1. The problem of medical care is bound up with the social and economic problem as a whole* and can be accurately analyzed only in this connection. Medicine . . . must mesh with the gears of general society and of economics." In other words, the social, mental, educational, economic status of the individual must be raised before he can receive and benefit by improved medical care.

. . . . . .

"7. There is wide agreement on the soundness of the principle that the individual should pay (in some manner) in accordance with his capacity to pay, and that *there is need* for establishing indigence (by just and generous means and with no implication of delinquency) and *of determining degrees of capacity to pay.*" Physicians do not believe in "free medical care" for those who can pay.

. . . . . .

"*10. The quality of medical care must be the determinant in all planning.* The physicians quoted in this section largely stress the point that no program of reform will succeed that is based wholly on economic considerations. They feel that social economists in the past, in dealing with the subject of medical care, have perhaps been more concerned with the cost and distribution of medical service than with the quality and character of the care itself." There will always be a danger in lay and political administration that the quality of medical care will suffer because of the failure to remunerate superior service adequately.

. . . . . .

"Better medicine, say the doctors, is more important than better distribution and lower costs.

"Leading educators and many medical

men outside the teaching institutions express the view, indeed, that medical education is really *the key* to the solution of the problem of better medical care for more people." The physician alone can be a really good judge of the character of the medical service, and only he realizes fully the necessity of practicing in the most enlightened manner.

As regards "Specialization," there is general accord that "as one gathers it from these letters: 'there are too many poor specialists and there are not enough good ones.'"

In discussing "Group Practice" the advantage of consultations is admitted but the best method of accomplishing it brings forth very diverse views. Here again the economic handicap is the great one.

The increasing importance of the hospital in the medical problem is stressed and it "is recognized that planning on a national base is ideally in order if hospital facilities are really to be related to the needs of the population and the facilities of medical science." This sounds like government control.

Discussing limited state medicine and private practice, the following statements appear: "The point of view most generally behind these proposals is that increased participation of government by evolutionary process is inevitable and desirable.

"Many of the contributors to this chapter look hopefully toward an eventual merging of preventive and curative medicine, and regard insistence on separating them as reactionary and stupid. They believe that preventive medicine will more and more be practiced in the doctor's office and that it will some day be generally recognized that the resources of medical science and the energies of the doctor are properly to be devoted to the prevention as well as to the cure of disease. The better health of the race becomes the objective.

"The development of the public health services, federal, state, and local, is regarded as an outstanding possibility in the search for solution of present problems.

"It is pointed out that year after year additional diseases are considered to be 'endowed with a public interest' involving governmental functioning. The list steadily increases: tuberculosis, cancer, pneumonia, syphilis, have already an admitted 'public' status; and there are in various states, proposals for including diseases of the heart and circulatory system, arthritis and other diseases which have been shown to be a large factor in disability among the population and which require a treatment too long and too expensive to be within the financial compass of most citizens."

It is really too bad that we who are vitally concerned in these matters of medical welfare pay so little attention to them.

In the next few years fundamental changes are apt to take place in the field of medical economics. It behooves each physician to study this problem carefully and arrive at as definite conclusions as he can. In general, the subject is distasteful to him. He studied medicine because he wanted to practice medicine—not politics or economics—and his reactions to being disturbed from his chosen work and thrust into such discussions and confronted by such possible changes are resentment and attempted withdrawal. This is tantamount to leaving the problem to someone else; no one wants it, and it is unfair that each should not shoulder his share of the burden.

This book is compiled from the contributions of 2,500 physicians, representing a good cross-section of medical public opinion. These men have devoted much time and thought to their comments. "American Medicine" will show concrete-

ly what problems confront the practitioner today and give the present reaction of physicians in the United States to those vital questions.

Lawrence T. Post.

BOOK NOTICES

INTERNAL DISEASES OF THE EYE AND ATLAS OF OPHTHALMOSCOPY. By Manuel Uribe Troncoso, M.D. Clothbound, 552 pages, 239 illustrations, including 82 colored plates. Philadelphia, F. A. Davis Company, 1937. Price $15.00.

This book represents the lifetime experience of a student, practitioner, investigator, and teacher of ophthalmology, whose continued activity is shown in the book notice, page 318 of the March number. The scope and arrangement of the work is shown by the headings of its different parts: I. Ophthalmoscopy, II. Structural features of the internal eye, III. The visual field, IV. Anomalies of development, V. Diseases of the optic nerve, VI. Atrophy of the optic nerve, VII. Vascular diseases of the retina, VIII. Diseases of the retina, IX. Diseases of the macular region, X. Retinitis in infectious diseases, XI. Pigmentary retinosis and allied diseases, XII. Detachment of the retina, XIII. Diseases of the choroid, XIV. Pathological changes in the vitreous body, XV. Injuries of the choroid, retina, and optic nerve.

The wisdom of a thoughtful, experienced teacher is shown in the chapter headings of each part. For instance, Part II begins with Chapter III, The normal fundus: A, The optic nerve; B, The fundus; C, The macula, and fundus with red-free light and photography of the fundus. Then Chapter IV, The physiology and pathology of the circulation in the retinal vessels, includes: The arterial pressure in the retina, The ophthalmodynamometer, Sphygmoscopy, The venous pressure, Pathological conditions, Intracranial hypertension, and Pathological pulsations. Each part of the book shows the same thoroughness in calling attention to and explaining each detail of practical importance, without dragging in matters not helpful to an understanding of the subject. The seven-page Table of Contents constitutes a syllabus of practical ophthalmoscopy.

The illustrations which make this a general atlas of ophthalmoscopy are selected, catalogued, and arranged to give the greatest help to the student, whether he be a specialist or general physician. They are not so large as the color plates of some other atlases showing pictures of the ocular fundus. But they are larger than those of Jaeger's Hand atlas, which were extensively copied to illustrate the early textbooks of ophthalmology. The legends which accompany them explain most directly and clearly to the student what he is looking at; whether in the book or in the similar picture he has found in the eye. This is a departure from the older method of giving the case history of the patient from whose eye the picture was originally made. It is striking evidence of skill and experience in teaching, showing the author to be a veteran teacher of ophthalmology.

No matter how much a book may contain, if it is to become a work for reference it must have a good index. This book has an index that occupies 18 double-column pages. Both authors' names and subjects are included in the same index. But authors' names are printed in italics, and subjects in the ordinary roman letters. This makes it as easy to consult, as a separate index for authors and subjects. The literature referred to comes quite up to date. Helmholtz, Donders, von Graefe are not ig-

nored; but Adler, Bedell, Bailliart, Arruga, Duke-Elder, Fuchs, and Paton are also recognized. It is an index that is not overburdened with complete bibliographies, but one that tells where to find all the book contains on the subject studied. If any important subject has been slighted it is one in which the author has done original work; as, glaucoma, or gonioscopy.

The author's fairness to his colleagues and readiness to use their help is shown in the names included in the legends explaining the illustrations of the color plates. Of the 82 color plates, giving 95 separate pictures, the majority are credited to colleagues who gave the stained sections, or whose cases are represented in them. The largest number of references to one colleague, in the index, are: 26 to Prof. Ernst Fuchs, 18 to Prof. Leber, 17 to J. S. Friedenwald, and 14 to de Schweinitz. Although Uribe Troncoso studied medicine and taught in Mexico, and made his earlier investigations in Paris, he has become a truly cosmopolitan ophthalmologist. His book presents the best general survey of its subject that has yet been published. It has not been dedicated to any particular teacher or leader, but is offered to all ophthalmologists. Edward Jackson.

NURSING IN DISEASES OF THE EYE, EAR, NOSE AND THROAT. Sixth edition. By members of the staff of the Manhattan Eye, Ear and Throat Hospital, New York City. 12mo., clothbound, 288 pages with 93 illustrations. Philadelphia and London, W. B. Saunders Co., West Washington Square, Philadelphia, 1937. Price $2.25 net.

This book from the Manhattan Eye, Ear and Throat Hospital covers the subject quite adequately. The pathology of the eye is treated very briefly, but the nursing of ophthalmic cases is quite properly considered very fully. Too often this type of book is a condensed textbook of diseases of the eye with very little instruction for the nurse. This is a practical, well-prepared volume that has the additional advantage of containing nursing instruction for those interested in otolaryngology as well as ophthalmology. This is of considerable importance because many nurses specialize in diseases of the nose and throat as well as of the eye. Lawrence T. Post.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, history
19. Anatomy, embryology, and comparative ophthalmology

1
GENERAL METHODS OF DIAGNOSIS

Bab, Werner. **Diagnostic dilatation of the pupil.** Klin. M. f. Augenh., 1937, v. 98, Jan., p. 83.

For years Bab has used syntropan in a two-percent solution in preference to homatropin, because the former lasts only a few hours. Immediately after examination two percent pilocarpin is instilled, and no increase of tension has been observed. C. Zimmermann.

Baratta, Orazio. **The Chediak-Dahr test for syphilis in ophthalmology.** Rassegna Ital. d'Ottal., 1936, v. 5, July-Aug., p. 406.

The author considers the new rapid test for syphilis described by Chediak-Dahr. He gives results of research on the blood of syphilitics with ocular manifestations in the three stages of the disease, in syphilis of the nervous system, and in the latent form. He also tested the reaction in individuals known to be healthy. The claims that the test is of equal specificity with the Wassermann reaction, and more sensitive, are confirmed. The ease of performance, the small amount of blood required (one drop), and the dependability and cheapness make it a valuable addition to our diagnostic measures. The author cites reaction percentages in the various forms of syphilis, and compares them with those of other serologic tests. Eugene M. Blake.

Barbel, I. E. **The Russian anomaloscope.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 6, p. 806.

Description and evaluation of an anomaloscope manufactured by the Leningrad Optical Institute. (Illustrations.) Ray K. Daily.

Bujadoux, A. **Cupola perimeter, a modification of the classical perimeter.** Ann. d'Ocul., 1936, v. 173, Nov., pp. 888-893.

The arms of the classical perimeter are replaced by a spherical bowl of brass, painted neutral gray and marked with circles corresponding to degrees of arc. A small light at the end of a tube and partially concealed by a diaphragm serves as an accurate fixation object. Magitot has devised a tiny instrument shaped like a pistol which is used to project the test object. Color filters make possible the projection of test spots of different color. Rheostats control the intensity of the light for fixation and for the projections. This apparatus provides a relatively simple and rapid means of mapping the visual field, including blind spots and scotomata. John C. Long.

Burke, J. W. **Transilluminator.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 239.

The transilluminator consists of a small brilliant bulb which can be forced between the margins of the eyelids and the orbital walls. The great value of the instrument lies in the possibility of accurately outlining subretinal growths not detectable by ophthalmoscopy.

David Harrington.

Evans, J. N. **Polarized light attachment for ophthalmoscopy.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 113.

The article briefly reviews the methods of polarizing light and describes a clamp attachment of polarizing plates which may be mounted on the ordinary ophthalmoscope. The method of use of the instrument is detailed and also some observations made with it. The corneal reflex is reduced, corneal nebulae are rendered more transparent, and certain retinal reflexes are abolished. (One descriptive plate.)

David Harrington.

Ferree, C. E., and Rand, G. **Examination and care of the eye in relation to lighting.** Arch. of Ophth., 1937, v. 17, Jan., pp. 78-103.

This study includes the relation of light to the structure of the eye and its muscles, as regards intensity of illumination, glare, position and the brightness of the light, and its color and composition. Tests for determining the preferred intensity of light, susceptibility to glare, and need of correction for color are described. The authors discuss methods whereby these various factors can be corrected.

J. Hewitt Judd.

Fontana, Giuseppe. **Weltmann's serum-coagulation-flocculation test in some eye conditions.** Rassegna Ital. d'Ottal., 1936, v. 5, May-June, p. 346.

The author employed Weltmann's blood-serum coagulation test in various types of glaucoma, parenchymatous keratitis, trachomatous pannus, cataract, phlyctenules, and other eye diseases. In all these cases there was a decrease in the band of coagulation (a left reading). Apparently the reaction demonstrates a change of the colloidal state of the serum in pathologic eye conditions, but it is not a diagnostic aid.

Eugene M. Blake.

Goldfeder, A. E., and Moldavskaja, V. D. **Malaria and the eye.** Arch. of Ophth., 1937, v. 17, Feb., pp. 228-233.

The authors point out that many cases of ocular disease in which malaria is an etiologic factor are incorrectly diagnosed, although the presence of malaria could be detected by the melanoflocculation reaction of Henry, which is based on the immunobiologic factors of the malarial process. Malarial involvement of the eye may include the transparent media, the retina, the choroid, the nerve, and the motor apparatus. Four cases are reported in detail.

J. Hewitt Judd.

Gradle, H. S. **Another test for malingering.** Amer. Jour. Ophth., 1937, v. 20, March, pp. 300-301.

Kisin, P. E. **A set of Tscherning's photometric lenses of Soviet manufacture.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 5, p. 657.

Examination of dark adaptation with Tscherning's photometric lenses is very convenient in military medical service, because of the easy portability of the lenses and because the examination does not have to be made in a dark room. The Soviet set and the technique of testing dark adaptation are described. (Illustrations.)

Ray K. Daily.

Lijo Pavia, J. **The green spot in the ocular fundus. New methods for differential diagnosis and new proofs.** Klin. M. f. Augenh., 1937, v. 98, Jan., p. 42.

The new diagnostic methods are ultrared ophthalmoscopy in the inverted and erect images and photography with ultrared filter and plate. Ultrared ophthalmoscopy renders visible and distinct pigment accumulations, retroretinal hemorrhage in the choroid, the substance in the choroid which corresponds to the green spot, and the

color proper of the choroid, which fills the intervascular spaces.

C. Zimmermann.

Lijo Pavia, J. **Ophthalmocinegraphy. Cinematography in ophthalmology.** Rev. Oto-Neuro-Oft., 1936, v. 11, Dec., p. 319.

The possibilities of slow projection are illustrated by strips of film of a case of Marcus Gunn phenomenon, taken with a speed of 62 frames per second, in order to demonstrate the relation of lid elevation to opposite jaw movement. By special arrangement fundus motion films have also been successful in the author's hands. M. Davidson.

Lijo Pavia. J. **Possibilities of slow motion pictures in ophthalmology.** Arch. de Oft. de Buenos Aires, 1936, v. 11, Dec., p. 707.

The possibilities in attaching a motion camera to the fundus camera and of the slow projection are discussed.

M. Davidson.

Lobeck, Erich. **The diameter of the retinal vessels in healthy and diseased individuals.** Graefe's Arch., 1937, v. 136, p. 439.

The measurements of the retinal blood vessels are made by means of a special ocular added to the simplified Gullstrand ophthalmoscope. In this ocular, which is placed forward in the ophthalmoscope, the front lens close to the observer's eye is divided into two halves by a meridional section in the optic axis. These two halves can be moved counter to each other by means of a screw and the amount of the movement read on a graduated scale. The principle is that of the heliometer which was employed more than 100 years ago by Fraunhofer for measurements of distances between stars. In the fundus of the eye, comparison can be made between the number of graduations separating the two halves of the divided lens when the diameter of the optic papilla (1.5 mm.) is measured and the number of graduations when the widths of the retinal arteries and veins are determined. Tables are given for the maximal and minimal values in millimeters of the widths of the retinal arteries and veins as well as the maximal and minimal values of the relation of the widths of the retinal arteries and veins to the diameter of the optic papilla in the normal, in red and pale hypertension, true nephrosclerosis, true nephrosclerosis with albuminuric retinitis, acute nephritis, nephrosis, chronic nephritis, chronic nephritis with albuminuric retinitis, and secondary contracted kidney. In another table are listed this ratio of breadths of the retinal arteries and veins to the diameter of the papilla in cases of spasm of the retinal arteries, thrombosis of the retinal veins, and angiomatosis retinae, and also after inhalation of amyl nitrite and after the use of acetylcholin.

H. D. Lamb.

Parsons, John. **Ophthalmology and research.** Brit. Jour. Ophth., 1937, v. 21, Jan., pp. 1-16.

The author demonstrates, by an analytic introduction, that normal vision must be studied through the agencies of physics, chemistry, physiology, neurology, and psychology. In detail he then discusses each of these agencies in relation to normal vision. He also stresses the point that the individual patient is as much—if not more—the basis of investigation as disease itself. To arrive at a plausible diagnosis one must be equipped with "wits" as well as technical knowledge and information. D. F. Harbridge.

Peyret, J. **Retinal tonoscopy.** Arch. de Oft. de Buenos Aires, 1936, v. 11, Oct., p. 588, and Nov., p. 638.

On the basis of a review of the literature and 32 case histories, the author arrives at the following conclusions: Bailliart tonoscopy coupled with determination of the Fritz index (see Amer. Jour. Ophth., 1931, v. 14, p. 80, and 1932, v. 15, p. 1095) furnishes information in advance of ophthalmoscopy as to the existence of general, ocular, and intracranial hypertension and arteriosclerosis. The method requires practice and is not always applicable. It is of greater value in diagnosis and prognosis of cardiovascular

and renal affections than in neurology. It is not necessary to take the intraocular tension into consideration in tonoscopy routinely. The normal Fritz index found in cerebral concussion and angiospasm serves to distinguish them from general hypertension, luetic optic atrophy, and ocular angiospasm, in which the index is high. Tonoscopy is of no help in the diagnosis of choked disc. M. Davidson.

Rubino, A. **The electrolytic threshold (serum reaction of Weltmann in ophthalmology) in some eye diseases.** Rassegna Ital. d'Ottal., 1936, v. 5, July-Aug., p. 415.

Rubino recently reported upon the precipitation flocculation test of the blood in trachoma (see Amer. Jour. Ophth., 1936, v. 19, p. 913), and the present article deals with the same test in other ocular diseases. In lymphatic diseases the precipitation was normal, slightly lowered in cataract, and somewhat elevated in glaucoma. In cataract the test is of little value, but it has definite value in glaucoma, especially in its relationship to the vascular system. The author's conception of the mechanism of the test is explained.
Eugene M. Blake.

Serr, H. **Clinical experience with the new Zeiss projection perimeter (according to Maggiore).** Graefe's Arch., 1937, v. 136, p. 477.

After clinical testing of this perimeter for nine months, both in normal and in pathologic individuals in the most varied peripheral disturbances as well as those affecting the center of the visual field, the author thinks this instrument represents a distinct advance. The semicircular arc of the perimeter is 8 cm. broad and 333 mm. long. On its concave side, it is finished a dull gray. At its vertex, for the point of fixation, a small cross has been punched out which is lighted from behind by the light source of the apparatus. The perimeter arc itself is not artificially lighted. The dull gray concavity of the perimeter arc receives only indirect daylight. Maggiore's basic idea is to project the test objects upon the perimeter arc by means of a small projection contrivance, so that the test objects have always the same degree of brightness. H. D. Lamb.

Towbin, B. G. **Vital staining of the eye.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 6, p. 843.

This is a report of an experimental study on rabbits. One-percent trypan blue was injected parenterally, and the eye and orbital contents examined at various intervals after the rabbits were killed. The findings show at first the largest quantity of the dye in the retroorbital tissues and in the conjunctiva especially at the limbus; and a smaller quantity in the ciliary processes. Later there is a shift in emphasis toward the ciliary processes, and finally after 103 days it is found only there. The structural changes in the cells containing the dye are also most pronounced in the ciliary processes.
Ray K. Daily.

Victoria, M. **Introducing the Rorschach test.** Rev. Oto-Neuro-Oft., 1937, v. 12, Feb., p. 29.

The Rorschach test used by educators for intelligence and character analysis is briefly explained.
M. Davidson.

Zurkowski, Jan. **The measurement of the height of the cornea.** Klinika Oczna, 1936, v. 14, pt. 6, p. 758.

A description of the author's device for determining the distance from the limbus to the apex of the cornea. This instrument should permit accurate measuring of corneal change in keratoconus, keratoglobus, staphyloma, and buphthalmos. (Illustrations.)
Ray K. Daily.

2

THERAPEUTICS AND OPERATIONS

Adamük, V. E., Masur, B. L., and Bylgakova, T. E. **The use in ophthalmology of tuberculin-free antivirus of the blue bacillus of Masur.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 5, p. 617.

Masur of the Kazan Institute succeeded in developing a tuberculin-free

filtrate of bouillon cultures of the non-acid-test bacillus of the coli-typhosus group which is claimed by Garran to be biologically identical with the tubercle bacillus. The advantages of this filtrate over the filtrate of tubercle bacilli are harmlessness and absence of tuberculin. The authors have used it in the form of compresses, instillations, and ointments in scrofulous blepharitis and keratoconjunctivitis, and as subconjunctival injections in more resistant cases, with very encouraging results. Ray K. Daily.

Dimitry, T. J. **Physiological relationship of the nose and eye.** Southern Med. Jour., 1936, v. 29, Aug., p. 812.

The author was interested in the effect of chaulmoogra oil on the nasal mucosa. When instilled in the nose and the eye, it is beneficial by excitation of the natural defenses of these organs.
Theodore M. Shapira.

Fry, W. E. **The reticulo-endothelial system of the eye.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 264.

This review of the reticulo-endothelial system of the eye does not lend itself to abstracting. It considers the reticulo-endothelial system, the technique of intravital staining, the representatives of the system in the normal eye, the response of the system's cells in the eye to traumatic and inflammatory stimuli, and experiments performed on rabbits indicating the location and activity of the cells.
David Harrington.

Gil, R. R., and Garcia Querol, A. **Sodium evipan anesthesia in ophthalmic surgery.** Arch. de Oft. de Buenos Aires, 1936, v. 11, Dec., p. 691.

The advantages of intravenous evipan anesthesia are summed up as follows: It can be used wherever general anesthesia is imperative, without the handicap for the surgeon of the proximity of the apparatus of inhalation anesthesia to the field of operation, and without postoperative nausea and vomiting. It has advantages over local infiltration anesthesia in plastic work in not deforming the field. It reduces intraocular tension. It is contraindicated in the presence of serious kidney and liver lesions and advanced arteriosclerosis. Cocainization of the conjunctiva is advised to prevent reflex sneezing or coughing from manipulation. M. Davidson.

Gill, W. D. **An iris-seizing forceps.** Amer. Jour. Ophth., 1937, v. 20, April, p. 408.

Goldberg, F. P. **A case of lupus of the cornea and conjunctiva treated with X rays.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 6, p. 893.

Report of a case with satisfactory result.

Lundy, J. S. **General anesthesia in operations on the eye, ear, nose, and throat.** Arch. of Ophth., 1937, v. 17, Jan., pp. 137-145.

The use of the intratracheal tube inserted through the nose or mouth is discussed. The newer agents employed for anesthesia are described and the advantages and disadvantages of each discussed. J. Hewitt Judd.

Manes, A. J. **The venom of the cobra snake in ocular lesions.** La Semana Med., 1936, v. 43, Dec. 31, pp. 1881-1882.

The author states that he has produced marked improvement of visual acuity in various pathologic conditions of retina and optic nerve, by intramuscular injections of 0.02 mg. of cobra venom. W. H. Crisp.

Mercandino, C. P. **Colors reducing eye fatigue in the operating room.** Rev. Oto-Neuro-Oft., 1937, v. 12, Jan., p. 21.

The color scheme used by Sheehan of New York in the operating room at the Doctor's Hospital effectively eliminates glare for the surgeon and soothes the patient. M. Davidson.

Mohamed, I. A. **Tebeprotein in diagnosis and treatment.** Giza Mem. Ophth. Lab., 10th annual report, 1935, pp. 123-136.

After two years' study of ocular tuberculosis in Egypt, the author be-

lieves that while manifest lesions are clinically and histologically rare, there are probably many atypical appearances due to a tuberculous allergy. Such allergy is often responsible for aggravation of an ocular affection of other cause. The author's experience has not shown that tebeprotein has any marked advantage over other forms of tuberculin in the treatment of tuberculous affections. But it is considered "more sensitive" and less toxic than Koch's "old tuberculin."

Lawrence G. Dunlap.

Promtov, V. A. **Substitution of diocain for cocaine.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 6, p. 849.

Diocain is a synthetic preparation with the same chemical formula as pantocain. After evaluating its properties clinically and in the laboratory the author advocates its use instead of cocaine, topically and by injection. It produces more rapid and prolonged anesthesia than cocaine. Its solution is stable and not decomposed by boiling. It does not produce mydriasis, rise of intraocular tension, or desquamation of corneal epithelium. It has double the toxicity of cocaine, but a smaller quantity is required for anesthesia.

Ray K. Daily.

Reitsch, W. **Pantocain as cause of eczema.** Klin. M. f. Augenh., 1936, v. 97, Dec., p. 773.

The ophthalmologist himself suffered for three years from intractable eczema with hyperkeratosis of the fingers, eczematous swelling of the lids, and pustular efflorescences in the face. The affection subsided after he discontinued the use of pantocain in his practice. Others may be sensitive to various substitutes for cocaine.

C. Zimmermann.

Soresi, A. L. **The use of tinted lenses in the operating room.** Amer. Jour. Ophth., 1937, v. 20, March, p. 301.

Szymanski, J. **A battery for catholysis, ionization, and Simon's transilluminator.** Klinika Oczna, 1936, v. 14, pt. 6, p. 784.

A description of the author's devices as to a battery for use in procedures requiring a weak galvanic current. (Illustration.) Ray K. Daily.

Trovati, Emma. **Vascular modification of the normal ocular fundus by the action of short waves.** Ann. di Ottal., 1936, v. 64, Sept., p. 603.

Short waves, so called in distinction from those of the usual diathermic apparatus, have deeper action and generate more heat. Both short-wave currents produced modifications in appearance of the optic disc and in the caliber of the papillary vessels. The hyperemia produced augmented intraocular secretion and was therefore contraindicated in glaucomatous eyes. Short-wave therapy may have a clinical value in suitable conditions. (Bibliography.)

Park Lewis.

Yanes, T. R. **Surgery in the one-eyed.** Rev. Cubana Oto-Neuro-Oft., 1936, v. 5, Sept.-Oct., p. 163.

When surgery, usually an extraction, is approached on an eye whose fellow has been lost as a result of operation by another surgeon, Yanes advises against assuming unskilled surgery as responsible for the previous failure, and urges extreme care in preoperative preparations, particularly in sterilization of the conjunctiva, and in choice of the least traumatizing type of operation. His own good results are attributed to such care, instilled into him by his teacher Ferrer. M. Davidson.

3

PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Allen, D. G. **A test for aniseikonia by the use of central fixation and fusion.** Arch. of Ophth., 1937, v. 17, Feb., pp. 320-327.

The test, which is quite accurate for size differences of one percent or more, is made by means of a stereoscope fitted with rotary prisms, specially designed targets, and size lenses. The targets consist of short lines drawn tangentially to a 6-cm. circle at the eight cardinal points. The circle is then erased and cross lines added to aid fusion. On one

side the tangent lines are red. The size difference is found when two of the overlapped images fuse and the others in the same meridian are separated. The size lens which permits fusion of the two images gives the percentage of size difference. J. Hewitt Judd.

Berens, Conrad. **A study of 288 patients examined with the ophthalmoeikonometer.** Brit. Jour. Ophth., 1937, v. 21, March, pp. 132-142.

This study was undertaken to evaluate the clinical importance of aniseikonia and of iseikonic lenses, the cases being observed at the New York Eye and Ear Infirmary during the year 1935. Details show that 55 patients were definitely relieved, 44 moderately benefited, 11 slightly helped, with 50 experiencing no relief at all; while 28 patients failed to obtain the lenses prescribed for them, and one hundred were not fitted for financial or other reasons, or because aniseikonia was not present. Much scientific research together with exhaustive clinical experiments and statistical analyses must be carried out before conclusions can be reached satisfactorily. (4 tables, bibliography.)
D. F. Harbridge.

Crooks, K. B. M. **Further observations on color blindness among negroes with genealogic and geographic charts.** Human Biology, 1936, v. 8, Sept., p. 451.

Ishihara's tests were done on 2,741 American negroes from seven to seventy years of age. Incidence of color blindness was 3.9 percent in males and 0.14 percent in females. Green blindness was three times as common as red blindness in females. The author concludes that there are definite racial differences in the incidence of color blindness. Geographic location has no effect on the color blindness of a racial group.
Theodore M. Shapira.

Eggers, Harry. **Effect of the position of a correcting lens on the size of the retinal image.** Arch. of Ophth., 1937, v. 17, Feb., pp. 328-339.

The physiologic optics involved in combinations of refracting units and determination of the size of the image in corrected myopia and hypermetropia are discussed. Variation in shape and position of the lens offers one method of correcting small amounts of aniseikonia. J. Hewitt Judd.

Fain, I. E. **Two cases of myopic fundus changes without myopia.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 6, p. 919.

One woman forty years old was a hyperope of two diopters, and the other seventy years old a hyperope of six diopters. Both had marked posterior staphylomas. Ray K. Daily.

Farina, Ferdinando. **Physiologic and pathologic astigmatism.** Rassegna Ital. d'Ottal., 1936, v. 5, July-Aug., p. 466.

This is a review of the subject with presentation of cases to demonstrate the difference between corneal and total astigmatism. A discussion of physiologic optics follows and a plea is made for more careful and conscientious work in refraction.
Eugene M. Blake.

Hecht, S., and Shlaer, S. **The color vision of dichromates.** Jour. Gen. Physiology, 1936, v. 20, Sept. 20, pp. 57 and 83.

The authors seek to determine the spectral sensibilities of the retinal cones and to correlate with them the quantitative properties of normal color vision. The articles are highly technical and do not lend themselves to abstracting.
Theodore M. Shapira.

Litinskii, G. A. **Norms of depth perception on the stereomyograph.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 5, p. 661.

To establish norms on the author's instrument he tested 215 young men, of normal visual acuity, without correction. The results show that the large majority of emmetropes can distinguish an interval of 1 mm. between vertically placed threads. The results of tests with horizontal threads are inconstant. The author attributes this variability to lack of development of horizontal depth perception, caused by the vertical position of objects in our

environment. The data show definitely that emmetropes have better depth perception than ametropes, and that depth perception is better in emmetropes engaged in vocations which exercise their depth perception, such as pilots. Muscle imbalance lowers depth perception. Ray K. Daily.

Ludvigh, E. J. **The gradient of retinal illumination and its practical significance.** Amer. Jour. Ophth., 1937, v. 20, March, pp. 260-265.

Marucci, Luigi. **Four cases of traumatic myopia.** Rassegna Ital. d'Ottal., 1936, v. 5, May-June, p. 327. (See Section 16, Injuries.)

Matveev, I. D. **Spectacles for protection of the palpebral fissure from light.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 6, p. 888.

The author has designed a protective spectacle, only the center of which consists of tinted glass. The upper and lower portions are clear, so that the worker is spared the necessity of putting the glasses off and on. (Illustrations.) Ray K. Daily.

Meader, R. **Accommodation and its reflex pathways in the teleosts.** Yale Jour. Biology and Med., 1936, v. 8, May, p. 511.

By correlating the available anatomic and physiologic evidence for accommodation in teleosts with the anatomic demonstration of fiber tracts and nuclear masses in the brain, the author suggests the organization of the nervous pathways which probably mediates the accommodative reflex.

Theodore M. Shapira.

Mieses-Reif, M. **Contents of pigment in hair and iris in its relation to refraction.** Folia Ophth. Orientalia, 1936, v. 2, Oct., p. 258.

The examination of a greater number of school children revealed that fair children had the greatest number of refractive errors of medium and higher degrees, while chestnut-haired children had less, and black-haired children had the smallest number of refractive errors. The same relation holds true as regards the color of the iris. Children from the city had a greater percentage of refractive errors than children from the country.

R. Grunfeld.

Mills, C. K. **Cross-cylinder tests.** Amer. Jour. Ophth., 1937, v. 20, April, pp. 408-410.

Olsho, S. L. **Thin lenses and bifocals for high myopia.** Amer. Jour. Ophth., 1937, v. 20, March, pp. 281-285.

Reis, Wiktor. **History of lenses and contact glasses.** Klinika Oczna, 1936, v. 14, pt. 6, p. 774.

A brief review of the literary references to lenses, a discussion of Goethe's myopia, a review of the literature on contact glasses, and a report of a case of keratoconus fitted with a contact glass prepared in accordance with Dallos's procedure. Ray K. Daily.

Riddell, W. J. B. **Hemophilia and color blindness occurring in the same family.** Brit. Jour. Ophth., 1937, v. 21, March, pp. 113-116.

The author reports a family, traced by deliberate search, with the uncommon association of hemophilia with color blindness among its members. The mother and two daughters were always healthy. Of the two surviving males both have color defects while one is hemophilic. Three males, all bleeders, died at three months, four years, and twenty-one years, respectively. (One table of genealogy.) D. F. Harbridge.

Stern, H. J. **The predominance of one hand and its influence on anisometropia and convergent strabismus.** Folia Ophth. Orientalia, 1936, v. 2, Oct., p. 253. (See Section 4, Ocular movements.)

Szymanski, J. **Metallic protheses for selection of contact glasses.** Klinika Oczna, 1936, v. 14, pt. 5, p. 624.

The author proposes an arrangement of metal models for this purpose. One model is used for the sclera and one

for the cornea, the selection being made by actual application to the anesthetized eye. Ray K. Daily.

Townes, C. D. **Statistical study of spectral-hue discrimination in trichromatic and dichromatic eyes.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 372.

An apparatus is described by which spectral-hue discrimination can be determined accurately, and the threshold values of 127 trichromatic subjects are presented. The hue-discrimination curve of protanopic and deuteranopic eyes is similar and has a single low threshold at about 490 millimicrons. This low threshold is the same for the color blind as for those with normal vision, because both groups possess in common an unimpaired function for blue. The paper does not lend itself to abstracting. David Harrington.

Williamson-Noble, F. A. **"Twincentric lenses."** Brit. Jour. Ophth., 1937, v. 21, March, pp. 116-117.

The author discusses the type of bifocal which has its optical center so placed as to avoid a prismatic jump in passing from distant to near and vice versa. (Illustrated.) D. F. Harbridge.

4

OCULAR MOVEMENTS

Berens, Conrad. **Surgical results in 223 cases of heterotropia.** Amer. Jour. Ophth., 1937, v. 20, March, pp. 266-276.

Cassidy, M. **Ophthalmoplegia due to aneurism of the internal carotid artery.** Proc. Royal Soc. Med., 1936, v. 29, April, p. 633.

The case was in a 61-year-old female whose vision was 6/24 and whose only previous symptom had been diplopia two years previously. Arteriography showed an aneurism of the internal carotid behind the orbit. The vessel was ligated without resulting complication. Theodore M. Shapira.

Hicks, A. M., and Hosford, G. N. **Cyclic paralysis of the oculomotor nerve.** Arch. of Ophth., 1937, v. 17, Feb., pp. 213-222.

The authors review briefly the 35 cases previously reported in the literature, and add two of congenital origin in young women aged eighteen and twenty years. The syndrome is characterized by alternating phases of spasm and relaxation that affect various branches of the always more or less paralyzed oculomotor nerve. These changes of phase occur independently of the will, and although the innervation of voluntary lateral movements may shorten or prolong the phase it does not prevent a change of phase. The paralysis may precede the onset of this cyclic phenomenon, but once the cyclic process is initiated it usually persists. It is thought that the main pathologic change is located primarily in the nucleus of the paralyzed oculomotor nerve, the greater part of which has degenerated, and only those ganglion cells at its caudal end which serve as the origin of nerve fibers to those muscles participating in the cyclic phenomenon are spared. (Bibliography.) J. Hewitt Judd.

Hunt, G. A. **A single-suture advancement operation.** Arch. of Ophth., 1927, v. 17, Jan., pp. 135-136.

This modification of Prince's advancement operation entails the use of one double-armed 000 ten-day chromicized catgut so passed through the muscle as to lock the stitch and prevent its tearing out, and at the same time prevent buckling of the muscle and insure flat attachment to the sclera. The procedure is well shown by a drawing. J. Hewitt Judd.

Kestenbaum, Alfred. **The genesis of nystagmus in miners.** (Remarks on Zeiss: miner's nystagmus.) Klin. M. f. Augenh., 1936, v. 97, Dec., p. 735.

Kestenbaum agrees with Zeiss that the chief cause of miner's nystagmus is deficient functioning of the fixation apparatus, produced by poor illumination. Therapeutic measures must be sought in improvement of the conditions of fixational function in and outside of the mines. C. Zimmermann.

Krimsky, Emanuel. **The stereoscope in theory and practice, also a new precision-type stereoscope.** Brit. Jour. Ophth., 1937, v. 21, April, pp. 161-197.

Under the headings "theoretical" and "practical" the author analyzes the optical principles of the use of the stereoscope. He compares his own stereoscope with those of Brewster and Holmes. (17 figures, 2 charts.)

D. F. Harbridge.

Laughlin, R. C. **Hereditary paralysis of the abducens nerve.** Amer. Jour. Ophth., 1937, v. 20, April, pp. 396-398.

Lyle, T. K. **Ocular torticollis and allied conditions.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 167.

The author outlines the differential diagnosis of ordinary and ocular torticollis, and gives the etiology of ocular torticollis in most cases as primary paresis of the superior rectus muscle on the side of the head tilt, with overaction of the complementary or synergic muscle of the other eye, that is the inferior oblique. The cases were divided and one group was treated by partial myectomy of the inferior oblique, another by exercises, and another by combined orthoptic and surgical treatment. (Illustrations.) Beulah Cushman.

Ohm, J. **Nystagmus in total congenital color blindness, its relation to miners' nystagmus, and remarks toward elucidation of color blindness.** Zeit. f. Augenh., 1937, v. 91, Jan., p. 20.

Ohm has recorded tracings of the movements of the eyeballs in six cases of total color blindness, and describes them minutely in this report. The similarity between this nystagmus and that observed in miners is as striking as it is unexpected. His theory in explanation of these facts is based essentially on the fact that electric oscillations are generated in the retina.

F. Herbert Haessler.

Shannon, C. E. G., and Gouterman, J. I. **Ocular muscle palsies in cases of toxic goiter.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 106.

A case of toxic goiter is described in which there were bilateral superior rectus and inferior oblique paralyses. Treatment consisted of transplanting the lateral rectus to the superior rectus muscle of each eye and bilateral inferior oblique tenotomy. There was no exophthalmos. Theories as to the cause of extraocular muscle palsies in toxic goiter are briefly reviewed.

David Harrington.

Stern, H. J. **The predominance of one hand and its influence on anisometropia and convergent strabismus.** Folia Ophth. Orientalia, 1936, v. 2, Oct., p. 253.

The author's own material of over 400 anisometropic refractions, together with statistical material by others, confirms the thesis that in sixty percent of anisometropic cases the right eye has the stronger refraction; that is it is more myopic or less hyperopic than the left eye. The author speculates as to the reason for this.

R. Grunfeld.

Streiff, J. **A tendon spreader aiding muscular advancement.** Klin. M. f. Augenh., 1937, v. 98, Jan., p. 80.

Closed, the instrument, which is illustrated, looks like a squint hook. It is slipped through a "button hole" under the insertion of the tendon. Opened, it spreads like an eye speculum into two branches, which keep the tendon stretched and thus facilitate suturing.

C. Zimmermann.

5
CONJUNCTIVA

Bakhir, D. M. **Pemphigus of the conjunctiva.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 6, p. 920.

A report of a case of pemphigus of the conjunctiva of the left eye in a patient suffering from complete urethral obstruction of undetermined etiology. Previous to this illness the patient had been perfectly well and there was no history of preceding infection.

Ray K. Daily.

Browning, J. H. **Bacteriology of ophthalmia neonatorum.** (Symposium,

see also Cardell, Marin Amat, Marquez, and Newsholme.) Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 24.

The reports on the organisms present in 1,000 consecutive cases of suspected gonococcal ophthalmia are given. Of this number 389 were pure staphylococcal, 118 staphylococcal with other organisms, 172 gonorrheal, 115 pneumococcic, 8 streptococcic, 2 from diphtheria bacillus, 2 the Morax-Axenfeld, 88 xerosis, 14 pneumobacillus, 3 micrococcus catarrhalis, and the remainder mixed infections. Beulah Cushman.

Busacca, Archimedes. **A simple and rapid method of demonstrating the Rickettsia bodies of trachoma with Victoria blue.** Folia Clin. et Biol., 1935, v. 7, no. 6, p. 253.

This is an application of Herzberg's method. The material is allowed to dry on a slide in air. The slide is stained in Victoria blue for five minutes and is then gently washed in distilled water.
F. A. Wies.

Cardell, J. D. M. **Ophthalmia neonatorum, general consideration.** (Symposium, see also Browning, Marin Amat, Marquez, and Newsholme.) Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 3.

The historical, clinical, and pathologic findings in gonorrheal ophthalmia are thoroughly covered. In 73 percent of the author's cases the discharge ceased in both eyes on the same day, independently of any difference in the amount of discharge in the two eyes at the beginning of the infection or during the course of the disease.
Beulah Cushman.

Ch'i, H. C. **Clinical experiences with local quinine therapy in trachoma.** Chinese Med. Jour., 1936, v. 50, Oct., pp. 1401-1404.

Ten cases of trachoma were treated by the Selinger method (Amer. Jour. Ophth., 1935, v. 18, July, p. 631), ten percent quinine bisulphate being painted on the lids after local anesthesia, followed in one minute by irrigation and then cold compresses. This was repeated semiweekly, then weekly and fortnightly for three months. Two percent quinine bisulphate ointment was used twice daily as home treatment. Subjective symptoms and objective signs improved in all cases, and more rapidly than with any other treatment. Lawrence G. Dunlap.

Cohen, Martin. **Treatment of trachoma.** Arch. of Ophth., 1937, v. 17, Feb., pp. 347-350.

A short summary of the usual procedures in treatment of trachoma is presented. J. Hewitt Judd.

Diponegoro, R. M. A., and Houwer, A. W. M. **A statistical contribution to the study of the etiology of pterygium.** Folia Ophth. Orientalia, 1936, v. 2, Oct., p. 195.

Infrared radiation must be considered the most important etiologic factor, while irritation by dust, wind, and dryness are of no etiologic importance. The pterygium never starts in the horizontal meridian but somewhat below, but after passing the corneal margin it can extend in all directions and thus the neck of the pterygium is formed. The authors believe that arcus senilis, which is more strongly developed in the tropics, resists development of pterygium. Young persons who already have a definite arcus senilis never have pterygium, and those who have pterygium never have a completely developed senile arcus.
R. Grunfeld.

Fai, M. C. **Hypodermic injections of carotene in the treatment of phlyctenular conditions and vitamin-A deficiency diseases in ophthalmology.** Chinese Med. Jour., 1936, v. 50, Oct., pp. 1453-1456.

The author has used with great satisfaction over a thousand hypodermic injections of carotene for phlyctenular conjunctivitis, keratoconjunctivitis, hordeolum, pigmentation, dryness and puffiness of the skin of the eyelid, xerophthalmia, and night blindness. For babies under two years he used 0.5 c.c. once, for children under ten years 1 c.c. repeated once three days later, and for

children over ten years and adults 1 c.c. repeated for three doses only. The only contraindication is cirrhosis of the liver. Lawrence G. Dunlap.

Hadibrota, R. S. **The results of various methods of treating gonorrheal conjunctivitis (non-neonatorum).** Folia Ophth. Orientalia, 1936, v. 2, Oct., p. 224.

The author compares the results gained with the newer method of treating gonorrheal ophthalmia, which consists of not instilling silver nitrate until the acute stage is over, with the results he obtained formerly when silver nitrate was instilled at once in the eye even during the acute stage. The newer treatment gives much better results, especially in cases in which corneal ulcer has already developed, but it is inferior in regard to preventing formation of corneal ulcer. R. Grunfeld.

Harrison, R. W., and Julianelle, L. A. **Studies on the infectivity of trachoma. 6. Cultivability of the infectious agent in tissue cultures.** Amer. Jour. Ophth., 1937, v. 20, April, pp. 360-367.

Johanssen, Ernst. **The etiology of gonoblennorrhea neonatorum.** Klin. M. f. Augenh., 1936, v. 97, Dec., p. 775.

On the 14th day a newborn child developed violent gonoblennorrhea, with numerous gonococci. The mother had vaginal gonorrhea and the child had had a coryza since the third day. The nasal secretion also contained numerous gonococci. In every case of vaginal gonorrhea of the mother the author considers it advisable after instillation of silver nitrate to continue with less irritating preparations, to prevent late infection. C. Zimmermann.

Julianelle, L. A., and Harrison, R. W. **Studies on the infectivity of trachoma. 5. Purification of the infectious agent by testicular passage.** Amer. Jour. Ophth., 1937, v. 20, April, pp. 353-360.

Kiang, S. M. **A case of tubercular ulcer of palpebral conjunctiva and cornea.** Chinese Med. Jour., 1936, v. 50, Oct., p. 1493.

A 13-month-old male with advanced tuberculosis of lungs and meninges, also bacillary dysentery and chronic suppurative otitis media, had ulcers of the upper lid, lower palpebral conjunctiva, and cornea without inflammatory signs. Tubercle bacilli were recovered from scrapings of the ulcers. The patient died six days later.
Lawrence G. Dunlap.

Krilov, T. K., and Rostovtzev, B. I. **The use of brilliant green in trachoma.** Sovietskii Viestnik Oft., 1936, v. 9, pt. 6, p. 902.

The author found subconjunctival injections of between 1 to 1000 and 1 to 4000 brilliant green very painful. A 0.5-percent aqueous solution used as collyrium caused rapid subsidence of secretion, but had no specific effect on the trachoma. Ray K. Daily.

Lijo Pavia, J. **Lymphoid reaction of the bulbar conjunctiva and tuberculin reaction.** Rev. Oto-Neuro-Oft., 1937, v. 12, Feb., p. 36.

In addition to four previously reported cases, the author reports on four new cases presenting in the conjunctiva ectasias of lymphatic vessels, small glassy semitransparent bodies, chemosis, and conjunctival and localized ciliary injection, all with clinical evidence of tuberculosis, and with positive Mantoux in three. Biopsy of one case showed lymphoid infiltration with mononuclears and plasma cells. (Illustrated with photomicrographs, anterior-segment photographs, and photographs of slitlamp aspects of the eyes.)
M. Davidson.

McKee, S. H. **Diphtheria of the conjunctiva: two cases.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 102. (See Amer. Jour. Ophth., 1937, v. 20, April, p. 438.)

Marin Amat, M. **Mercurochrome in ophthalmia neonatorum; its healing and prophylactic value.** (Symposium, see also Browning, Cardell, Marquez, and Newsholme.) Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 38.

The solution used in the eye is four percent in twice distilled water. Six

case reports are given. The author feels that proper use of mercurochrome is superior to the Credé method.

Beulah Cushman.

Marquez, M. **Treatment of ophthalmia neonatorum.** (Symposium, see also Browning, Cardell, Marin Amat, and Newsholme.) Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 33.

The author stresses exaggeration of chemical prophylaxis, abuse of silver-nitrate stick, and rational use of silver-nitrate solutions. The silver-nitrate solution should not touch the cornea, and in forgetting this lies the secret of the appearance of a great number of corneal complications. He advises treating the lids separately, protecting the cornea with the other lid, neutralizing with sodium chloride after five or ten seconds, and following with sterile water or boric solution to wash away the silver chloride. Starting with 2-percent solution, the strength of the silver-nitrate solution is to be reduced each day as the process improves.

Beulah Cushman.

Newsholme, H. P. **Ophthalmia neonatorum, administrative aspects.** (Symposium, see also Browning, Cardell, Marin Amat, and Marquez.) Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 15.

Cases reported under the law include "purulent discharge from the eyes of an infant commencing within 21 days from date of birth," so that the public health officer is dealing with gonococcal ophthalmia plus large numbers of other, usually less grave, kinds of ophthalmia. The large number of cases reported is due to the activity in supervision of midwives, encouragement to report cases, strong pressure to send all cases to the hospital, and the routine use of 1 percent silver nitrate. The percentage of gonococcal infections was reduced from 6 percent in 1928 to 0.8 percent in 1935, although 481 cases were reported in 1928 and 644 in 1935. The decrease is due to decrease in gonorrhea in the female population, effective treatment, and improved midwifery service with better antenatal and natal care.

In Birmingham 10.5 percent of the total of blind persons are blind through ophthalmia neonatorum.

Beulah Cushman.

Pashkovskii, V. M. **Repeated expression in trachoma.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 5, p. 708.

The author's personal experience convinces him that Filatov's method of repeated expression in trachoma is as effective as initial expression followed by daily applications of a copper pencil, and lends itself better to treatment of a farming population. Ray K. Daily.

Pillat, A., and David, H. **Tularemia in man in Austria.** Zeit. f. Augenh., 1937, v. 91, Jan., p. 1.

The portal of entry was the eye. The discrepancy between the very mild affection of the eye and the very severe general bodily infection was notable. The characteristics of the causative organism are described minutely. This is the first case of oculoglandular tularemia in Austria in which the clinical diagnosis was made and corroborated by culture of Bacterium tularense from a guinea pig which had been inoculated intraperitoneally with conjunctival granulation tissue. Pillat considers oculoglandular tularemia identical with Parinaud's disease and urges that we do not prolong confusion by retaining a multiplicity of clinical names that originated in prebacteriologic days.

F. Herbert Haessler.

Pokrovskii, A. I. **Anatomo-pathologic changes in trachoma and follicular conjunctivitis in relation to the pathogenesis of these diseases.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 5, p. 579, and pt. 6, p. 755.

A comprehensive survey of the literature and of the author's own clinical and laboratory investigations. The reaction of the adenoid tissue of the conjunctiva is identical with that of adenoid tissue elsewhere. The structure of follicles and of the subepithelial layer of adenoid tissue is the same throughout the body and follicles may be every-

where umstable temporary phenomena. Everywhere the follicle goes through the same phases of development, the active phase of the center being a result of irritants in the surrounding tissue. During this reactive phase the cells multiply and die. Degeneration and necrosis are common to all reactions, differing only in intensity and extent. In folliculosis the pathologic picture varies in number and size of follicles, in their position in relation to the epithelium, in the phase of their centers, and in degree of subepithelial infiltration. The histologic picture of trachoma also varies in the number of follicles, in their size and form, in the structure of the centers of the follicles, in degree of infiltration of interfollicular connective tissue, and in involvement and extent of degenerative changes in the deeper conjunctival layers. The predominance of proliferating inflammatory processes, degeneration, and cicatrization differentiate trachoma from other inflammations of the conjunctiva. The trachomatous process begins in the subepithelial layer and advances deeper into the conjunctiva and into the adjacent tissue. The author, contrary to Pascheff, considers trachoma as an inflammatory process the pathogenesis of which will be solved by bacteriologic investigation. (Illustrations.) Ray K. Daily.

Puscariu, E., and Lazarescu, D. **The eye and general infections. Gonorrheal conjunctivitis and arthritis.** Ann. d'Ocul., 1936, v. 173, Nov., pp. 893-906.

Arthritis is a very rare complication of gonorrheal conjunctivitis. After discussing the literature at some length, the authors report three cases of arthritis encountered in 461 patients with gonorrheal conjunctivitis. The first case was in an infant with congenital syphilis. Both parents had genital gonorrhea. The child had inclusion blenorrhea shortly after birth. At five months of age a bilateral gonorrheal conjunctivitis developed, followed by polyarthritis. Cure occurred in sixteen days after milk injections and local treatment. The mother of this child had gonorrheal conjunctivitis followed by arthritis of the knee joint. The mother was successfully treated with gonococcic vaccine and infrared rays. The third case developed specific ophthalmia at five weeks of age. The tibio-tarsal articulation became involved during the second week of the eye infection. Milk injections were given and the arthritis cleared up in ten days.

John C. Long.

Selinger, E. **Trachoma therapy with quinine bisulphate.** Chinese Med. Jour., 1936, v. 50, Oct., pp. 1449-1452.

The rationale and technique are discussed. Results indicate that this form of treatment is shorter than that with copper sulphate and chaulmoogra oil, that corneal complications are favorably influenced by it, and that the final visual results are better than with other trachoma therapy.

Lawrence G. Dunlap.

Sorsby, A., Hamburger, R., Benham, R. **The etiology of phlyctenular ophthalmia.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 63.

Historical description and review of the literature are given. The authors conclude that the phlycten is generally precipitated by an exogenous factor acting on a sensitized soil. Reports include 130 cases of phlyctenular keratitis and a control series of 122 cases of blepharitis, as well as 238 unselected cases of phlyctenular ophthalmia treated between 1924 and 1930 under the London County Council scheme for detecting notifiable tuberculosis. Clinical findings support the experimental evidence that there is no one cause for formation of the phlycten, but in seventy percent of the cases sensitization appears to be produced by the tubercle bacillus lodged in the body.

Beulah Cushman.

Thygeson, Phillips. **Ophthalmia neonatorum.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 340.

An etiologic diagnosis was made in 86.6 percent of these 261 cases of ophthalmia neonatorum caused by a limited group of bacteria. Credé's method of prophylaxis is shown to be excellent

against gonorrheal ophthalmia, only one case having been found in 3,939 births. Clinical and bacteriologic differentiation among the various types of ophthalmia neonatorum is described. (Bibliography.) David Harrington.

Veis, A. S. **Antivirus of Dr. B. L. Mazur in the therapy of scrofulous keratoconjunctivitis.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 6, p. 847.

The author used this antivirus in the form of a one per cent ointment in thirty cases of severe recurrent keratoconjunctivitis. In over fifty per cent of the cases complete recovery occurred. Ray K. Daily.

Von Hamm, E., and Hartwell, R. **Experimental conjunctivitis caused by the virus of lymphogranuloma inguinale.** Jour. Tropical Med. and Hygiene, 1936, v. 39, Aug. 15, p. 190.

The authors induced hemorrhagic and purulent conjunctivitis in mice, monkeys, and cats by intracerebral inoculation. In every case death resulted from meningoencephalitis.

Theodore M. Shapira.

Wilson, R. P. **The various forms of conjunctivitis among children in Egypt and the Near East.** 10th annual report. Giza Mem. Ophth. Lab., 1935, pp. 90-122.

The director of the Giza Memorial Laboratory notes the almost complete absence of ophthalmia neonatorum in Egypt and Palestine, in contrast to the prevalence of gonococcal conjunctivitis in older children and of gonorrhea in the larger cities. Inclusion blenorrhea of the new-born is unknown in Egypt. Probably by the age of ten years forty percent of the children are infected with the Morax-Axenfeld bacillus. Koch-Weeks and gonococcal conjunctivitis are constant, but in the summer assume epidemic proportions. Few Egyptian children reach the end of the first year, and none reach the end of the second year of life, without having an attack of acute ophthalmia. Gonococcal conjunctivitis in Egypt is not of venereal origin but is carried from eye to eye. Other causes of acute conjunctivitis are rare. Flies are considered to be the disseminators of the various forms of conjunctivitis. Trachoma usually appears after an acute attack of conjunctivitis, most often of the Koch-Weeks type, less frequently after gonococcal, and rarely after Morax-Axenfeld conjunctivitis. "Where there is much ophthalmia there will be much trachoma provided that trachoma is endemic."

Lawrence G. Dunlap.

Woods, A. C. **Clinical problem of allergy in relation to conjunctivitis and iritis.** Arch. of Ophth., 1937, v. 17, Jan., pp. 1-17; also Trans. Amer. Acad. Ophth. and Otolaryng., 1936, 41st annual meeting, p. 411.

Allergic conjunctivitis appears in three forms; (1) sudden transitory conjunctivitis with edema, chemosis and congestion; (2) chronic blepharoconjunctivitis with a tendency to eczema; and (3) a chronic recurrent conjunctivitis often associated with folliculosis and blepharitis. The author discusses the relationship of conjunctivitis to the specific allergens and to the bacterial toxins, especially staphylococcus and streptococcus. Diagnosis is based on specific cutaneous hypersensitivity, and treatment consists in isolation from the offending allergen or specific desensitization. The allergic characteristics of vernal conjunctivitis are discussed. Recent experimental work has indicated that certain types of recurrent uveitis and iritis are probably allergic reactions. J. Hewitt Judd.

Wright, R. E. **Trachoma.** Brit. Jour. Ophth., 1937, v. 21, April, pp. 198-201.

Clinical investigations for 1935-1936 were occupied with testing the infectivity of filtered trachoma material. The author compares the findings with those outlined in a previous article (see Amer. Jour. Ophth., 1935, v. 18, p. 988).

D. F. Harbridge.

6

CORNEA AND SCLERA

Borsotti, Ippolito. **Behavior of the reticulo-endothelial system in septic lesions of the cornea.** Rassegna Ital. d'Ottal., 1936, v. 5, May-June, p, 306.

In order to study the behavior of the histiocytes in septic ulcers of the cornea, the author made intravenous injections of "thoriophanin" and lithiocarmin in rabbits. After inoculating the cornea with staphylococci he placed powdered dionin in the conjunctival sac. The eyes were enucleated after various intervals and studied. In the first few days after a central ulcer of the cornea had become established, he observed mobilization of the histiocytes. Such elements reached the lesion. After six to nine days, elements coming from the limbus and conjunctiva reached the lesion, and in this period such elements resisted more easily the action of toxic substances from the ulcer. Also at this time there was reactivation of the resting elements in limbus and cornea. Cells migrated toward the ulcer and showed active proliferation. Augmentation of the histiocytes progressed until about the twentieth day and proceeded pari passu with the reparative processes. (17 figures.)

Eugene M. Blake.

Donin, I. K. **Lysozyme therapy in ulcers of the cornea.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 5, p. 638.

A tabulated report of 34 cases treated by instillation of lysozyme every two hours. In 33 cases the results were excellent.

Ray K. Daily.

Farina, Ferdinando. **Traumatic interstitial keratitis in one eye, extending to the other.** Rassegna Ital. d'Ottal., 1936, v. 5, May-June, p. 362. (See Section 16, Injuries.)

Hilgartner, H. L., Jr., and Hilgartner, H. L., Sr. **Nodular dystrophy of the cornea.** Amer. Jour. Ophth., 1937, v. 20, April, pp. 387-389.

Hůlka, J. H. **Metastatic pneumoccic uveoscleritis following pneumonia.** Arch. of Ophth., 1937, v. 17, Jan., pp. 127-134. (See Section 7, Uveal tract, sympathetic disease, and aqueous humor.)

Lasky, M. A. **Krukenberg's spindle.** Amer. Jour. Ophth., 1937, v. 20, April, pp. 399-401.

Peppmüller, Friedrick. **A hitherto undescribed bilateral symmetric subepithelial corneal opacity in a case of Paget's osteitis deformans.** Klin. M. f. Augenh., 1937, v. 98, Jan., p. 1.

In a man of 62 years with osteitis deformans a bilateral symmetric grayish-brown opacity of Bowman's membrane in the interpalpebral zone was progressive during an observation of several years. It was not due to melanin pigment but was very probably a degeneration. Doubt was felt whether the cause was general arteriosclerosis or the specific metabolic alterations of Paget's disease.

C. Zimmermann.

Rinaldi, S. **On the antigenic properties of corneal protein.** Ann. di Ottal., 1936, v. 64, Oct., pp. 649 and 691.

From the complement-deviation reaction on blood serum of animals treated with subcutaneous injection of corneal protein, the author was unable to sustain the contention of others that corneal protein possesses antigenic properties. Use of bovine corneal protein intradermically in affections of the human cornea and in normal conditions confirmed the results of animal experimentation. (Bibliography.)

Park Lewis.

Rodger, T. R. **Otosclerosis associated with blue sclerotics and fragilitas ossium.** Proc. Royal Soc. Med., 1936, v. 29, p. 1107.

The author reports three cases and states that dominance is a factor. He says that one half of a generation is usually affected.

Theodore M. Shapira.

Thomas, J. W. T. **Experimental heterogeneous corneal grafts.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 97.

Heterogeneous grafts can unite but they do not remain transparent and they become vascularized. The blood vessels come from the iris if it is adherent, and by growth of blood vessels through the recipient cornea from the limbus. Primary union of the graft tends to be incomplete. The growth of

epithelium from the recipient cornea is supported by a subepithelial layer consisting of new vascularized tissue derived largely from the stroma of the recipient cornea. Behind the graft a layer of fibers is formed from the endothelium and deep corneal fibers of the recipient eye, and behind this there develops a new posterior elastic membrane. Heterogeneous corneal grafts should not be used for corneal transplantation in man.

Beulah Cushman.

Thygeson, Phillips. **Trachomatous keratitis.** Arch. of Ophth., 1937, v. 17, Jan., pp. 18-26.

The author studied 248 Indian children between the ages of six and nineteen years from the school for trachomatous children, and 32 children with normal conjunctiva. The trachoma found differed in no essential way from that of the white race, and all could be classified easily according to MacCallan's classification. The vascular and infiltrative changes characteristic of trachomatous pannus were observed by biomicroscopic examination in 96.2 percent of those found to have trachoma. These changes, which are discussed and illustrated by drawings, consist of extensions of the vessels into the cornea, limbic follicles, Herbert's peripheral pits, diffuse subepithelial infiltrates, localized subepithelial infiltrates, minute punctate epithelial lesions stainable with fluorescein, and corneal scars. This study shows that the first signs of trachomatous pannus appear early in the disease. J. Hewitt Judd.

Wilson, R. P. **Tuberculous abscess of cornea.** Giza Mem. Ophth. Lab., 10th annual report, 1935, p. 68.

A male aged 21 years had noticed epiphora of his right eye for two years. A tiny greyish-white raised spot in the upper outer quadrant of the cornea 3 mm. from the limbus was pricked, the bleb collapsed, and a tiny bead of soft greyish material was found to contain cellular débris, with the appearance of a pure culture of tubercle bacilli.

Lawrence G. Dunlap.

7

UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Henton, H. C. **Opsonic index for uveal pigment in treated patients.** Arch. of Ophth., 1937, v. 17, Jan., pp. 113-116.

The heparinized blood and the blood serum, obtained from two patients with sympathetic ophthalmia receiving pigment therapy, was compared with similar specimens from patients with a variety of ocular conditions receiving other types of treatment. A definite increase in the opsonic index was found following treatment with beef uveal pigment. Since an increase in index for human pigment occurred also, these findings add further proof of the organ specificity of pigment.

J. Hewitt Judd.

Hůlka, J. H. **Metastatic pneumococcic uveoscleritis following pneumonia.** Arch. of Ophth., 1937, v. 17, Jan., pp. 127-134.

During an attack of lobar pneumonia of the right lung, a woman aged forty years developed violent inflammation of the sclera and uvea simultaneously with formation of an abscess between the limbus and the tendon of the superior rectus muscle of the left eye. This was thought to be the result of a septic embolus lodging in one of the scleral canals formed by the anterior ciliary arteries. The histologic findings are illustrated by photomicrographs.

J. Hewitt Judd.

MacLean, A. L. **Experimental iritis.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 324.

This paper substantiates the work of Swift and his co-workers and extends their observations to show that the uveal tract participates in general sensitization to green streptococci, and that as a result of such sensitization the intoxicated, untraumatized eye may show a transient uveal inflammation. In the author's opinion the allergic hypothesis as to the etiology of iritis is tenable. David Harrington.

Velhagen, C., Sr. **Purulent iridocyclitis with gonococci in the interior of the eye.** Klin. M. f. Augenh., 1937, v. 98, Jan., p. 20.

A girl of twenty years showed iritis with gradually developing hypopyon, yellow reflex from the vitreous and opacity of the lens, intense hypertension, pain, and loss of vision, necessitating enucleation. Although no gonococci were found in the urethra and vagina, they were present in the eye. (Illustration.) C. Zimmermann.

Wilson, R. P. **Bone formation in prolapse of iris through perforating ulcer of cornea.** Giza Mem. Ophth. Lab., 10th annual report, 1935, p. 42.

An eye the vision of which had been lost 35 years previously through purulent ophthalmia presented a round, smooth, hard, calcareous, yellow mass protruding through a shrunken distorted cornea. The protruding mass showed marked bone formation.

Lawrence G. Dunlap.

Wilson, R. P. **Massive tuberculous choroiditis with perforation of sclera.** Giza Mem. Ophth. Lab., 1935, 10th annual report, p. 43.

A five-year-old boy was seen with a large yellowish raised fungating mass above and to the nasal side of the right cornea. As the eye was blind and soft, it was enucleated. The large caseating tubercle nearly filling the vitreous chamber was found to extend from the optic disc to the ciliary region, where the sclera was eroded through. No tuberculosis local or general was found a year later. A similar case was seen in a boy of five years.

Lawrence G. Dunlap.

Woods, A. C. **Clinical problem of allergy in relation to conjunctivitis and iritis.** Arch. of Ophth., 1937, v. 17, Jan., pp. 1-17; also Trans. Amer. Acad. Ophth. and Otolaryng., 1936, 41st annual meeting, p. 411. (See Section 5, Conjunctiva.)

8

GLAUCOMA AND OCULAR TENSION

Wilson, R. P. **Late infection of trephine operation producing septic endophthalmitis.** Giza Mem. Ophth. Lab., 10th annual report, 1935, p. 49.

A female aged sixty years, who three years previously had had bilateral trephine operations, developed a purulent endophthalmitis of one eye which necessitated enucleation.

Lawrence G. Dunlap.

9

CRYSTALLINE LENS

Burge, W. E., Wickwire, G. C., and Schamp, H. M. **Cause of calcification of the crystalline lens; with advance in age and in cataract.** Arch. of Ophth., 1937, v. 17, Feb., pp. 234-240.

By means of a galvanometer, irradiations of preparations of pig lenses by ultraviolet, sunlight, and infrared were found to produce ionization, rendering the lens materially electronegative. This would be effective in producing lens calcification and cataract. The short wave-lengths are more effective than the longer ones. A filter having the same absorption as the cornea showed that the wave length 302 millimicra, which is transmitted by the cornea, causes the same changes.

J. Hewitt Judd.

Davis, F. A. **Capsule forceps for intracapsular cataract extraction.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 239.

These forceps are designed with long, broad, smooth blades which permit of grasping a large area of the anterior lens capsule with a minimum danger of tearing. The pull or traction is thus distributed throughout the entire circumference of the lens. The forceps are suitable for use with either the Knapp or Elschnig method of extraction.

David Harrington.

Lloyd, R. I. **A second group of cases of arachnodactyly.** Arch. of Ophth., 1937, v. 17, Jan., pp. 66-77; also Trans. Amer. Ophth. Soc., 1936, v. 34, p. 37.

To six cases reported two years ago (see Amer. Jour. Ophth., 1935, v. 18, p. 995) the author adds nine more, which emphasize hereditary influence but do not help explain the origin of the condition. Spherophakia and microphakia

were found and appeared to be advanced stages of congenital dislocation of the lens. Some of the findings are syringomyelic in type, and are associated with such trophic disturbances as heterochromia and Horner's syndrome.
J. Hewitt Judd.

Marín Amat, M. **Intracapsular cataract extraction with forceps.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 135.

The author favors intracapsular extraction, as all tissue liable to become opaque by formation of secondary cataract is removed.

It is contraindicated if the pupil does not dilate ad maximum or if there are posterior adhesions. Comparison is made of results in 52 intracapsular and 64 extracapsular operations.
Beulah Cushman.

Pfingst, A. O. **Expulsive choroidal hemorrhage complicating cataract extraction.** Southern Med. Jour., 1936, v. 29, March, p. 323.

The author reports four cases, three of which had glaucoma and the other an arterial hypertension. The condition is rare and is due to rupture of choroidal veins. Theodore M. Shapira.

Purtscher, E., and Dibold, H. **Intracapsular cataract extraction in diabetics.** Klin. M. f. Augenh., 1937, v. 98, Jan., p. 24.

The ophthalmic surgeon must not overlook diabetes and the appropriate preparation for operation and after treatment. This need and the complications are discussed in detail with clinical histories and 37 tabulated cases. The tendency to hemorrhage during operation, especially with the flap incision, persists during the action of insulin and also in hemorrhagic retinitis with and without hypertension. Escape of pigment into the anterior chamber may be expected in diabetes of long duration. The great percentage of cases of hypertension in diabetic cataract patients is striking. Postoperative irritation was also found more frequently in diabetics. Otherwise operation and healing after appropriate preparatory treatment, as well as the visual results, did not essentially differ from those of non-diabetics. C. Zimmermann.

Scammon, R. E., and Hesdorffer, M. B. **Growth in mass and volume of the human lens in postnatal life.** Arch of Ophth., 1937, v. 17, Jan., pp. 104-112.

This report is based on examination of 230 fresh and presumably normal human lenses as previously published in the literature, supplemented by the authors' determinations on the lenses of ten full-term new-born children. These data are sufficient to permit tracing a curve for postnatal growth of the lens and the computation of certain constants. In infancy and early childhood the lens grows rapidly. It then enters a period of slow and steady growth which continues throughout the remainder of life. The continued growth through middle and old age may be associated with loss of elasticity of the lens. J. Hewitt Judd.

Verhoeff, F. H. **A new instrument for facilitating the suturing of the wound in operations for cataract.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 236.

The author presents a modification of his previously described instrument for facilitating the placing of corneoscleral sutures in cataract operations (see Amer. Jour. Ophth., 1936, v. 19, p. 530). It is simpler and easier to use than the original, gives close apposition of the lips of the wound, and may also be used in suturing accidental wounds of the cornea and sclera.
David Harrington.

Wilson, R. P. **A peculiar form of cataract associated with glaucoma.** Giza Mem. Ophth. Lab., 10th annual report, 1935, p. 70.

A case report of opacities of the anterior polar type and adult nucleus, tension of 55 mm. Hg rising to 78 mm. Hg, and an obviously traumatic hole in the iris near the upper limbus.
Lawrence G. Dunlap.

Wright, R. E. **Lectures on cataract. 4. Posterior-segment complications in the postoperative period; some difficult**

extractions. Amer. Jour. Ophth., 1937, v. 20, April, pp. 376-387.

10

RETINA AND VITREOUS

Adrogué, E., and Tettamanti, J. **Leukemic retinitis.** Arch. de Oft. de Buenos Aires, 1936, v. 11, Dec., p. 697.

A case of retinitis in chronic myeloid leukemia in a child of fourteen years is described and illustrated by fundus photographs, and it is pointed out that generally the ophthalmoscopic picture alone is inadequate for making the diagnosis of the underlying disease.

M. Davidson.

Bhaduri, B. N., and Biswas, C. K. **Retinal hemorrhages in epidemic dropsy.** Calcutta Med. Jour., 1936, v. 30, April, p. 582.

The authors report retinal hemorrhages in four cases of epidemic dropsy. Before onset of the dropsy a secondary anemia was present. Three cases recovered without complication under general treatment and one case developed glaucoma.

Theodore M. Shapira.

Campos, Raffaele. **The behavior of the ocular tissues under the action of chemical and pharmacologic substances introduced into the anterior chamber and vitreous.** Ann. di Ottal. 1936, v. 64, July, p. 456, Aug., p. 538, Sept., p. 577.

This study, for which the author received the Cirincione international prize in 1935, is an important addition to our knowledge of the interchange of energy and matter in the retina. The author reviews research on the retina in general, the technique employed, and individual studies. The immediate purpose was to determine the effect of light on the gaseous retinal interchange. The retina of the rat was first employed in these experiments, and later that of the rabbit, as well as that of human eyes excised because of injury or disease in which the nervous structures were not involved. Further studies dealt with the action of light on glycolysis and the respiratory function, and the metabolic changes in albino and pigmented animals.

Among the author's conclusions are the following: Exposure of the living eye to bright light gives rise to a characteristic effect on respiration, the dark-adapted retina showing a respiratory activity that diminishes regularly for the first ten minutes and then gradually increases to normal; and the retina subjected to intense light showing in the dark a respiratory intensity that during the first ten minutes is almost always inferior to that of the dark-adapted retina, then ascends until at the end of twenty or thirty minutes it is higher than that of the dark-adapted retina. The descending curve of the light-exposed retina maintains a higher value throughout than that of the dark-adapted eye. This action is least constant in the macula and the perimacular region, where it is often impossible to demonstrate consumption of oxygen in either the light-exposed or the dark-adapted retina. Research on the retina of the gray rat demonstrated that the relation of retinal respiration to glycolysis was always greater in pigmented animals than in albinos. (Bibliography.

Park Lewis.

Davison, C., Brock, S., and Dyke, C. G. **Retinal and central nervous hemangioblastomatosis with visceral changes (von Hippel-Lindau's disease).** Bull. Neur. Inst. of New York, 1936, v. 5, Aug., p. 72.

The authors' case was first seen when the patient was fourteen years old. The ocular diagnosis at that time was retinitis exudativa (Coats's disease). Twenty years later the eyes were obtained for pathologic study, and the diagnosis of Hippel's disease was made. The boy became blind in the second eye, within seven years. In the beginning the retinae disclosed engorged vessels, hemorrhages, and grayish masses; later came retinal detachment, secondary glaucoma, and calcification of the uveal tracts. Death thirteen years later was due to involvement of the medulla oblongata. This is the first report of intraocular calcification in association with this disease.

Theodore M. Shapira.

Gesell, A., and Blake, E. M. **Twinning and ocular pathology, with a report of bilateral macular coloboma in monozygotic twins.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 47. (See Amer. Jour. Ophth., 1936, v. 19, Sept., p. 815)

Granström, K. O. **A case of Oguchi's disease in Sweden.** Klin. M. f. Augenh., 1937, v. 98, Jan., p. 77.

A man of 25 years, who had been affected with hemeralopia since childhood, presented yellowish-white patches in the fundus. After being in the dark for half an hour the fundus appeared perfectly normal. Ethnologically he was of Nordic type, but the ophthalmoscopic changes showed complete similarity to Oguchi's disease.

C. Zimmermann.

Kamogawa, A. **Alterations of blood pressure in the central retinal artery by changes of position of the healthy human body.** 2nd communication. Klin. M. f. Augenh., 1937, v. 98, Jan., p. 54.

In this second article the author gives the results of his investigations on changes of blood pressure in the central retinal artery in ten healthy persons for an hour after transition from the sitting to the horizontal position. The measurements were taken every ten minutes. Within the first ten minutes the descending curve of the blood pressure was steep, then relatively less. One hour after lying down the blood pressure averaged 7.7 mm. Hg diastolic and 9.7 mm. systolic lower than immediately after lying down. One hour after lying down the pressure was 3.5 mm. Hg diastolic and 2.8 mm. Hg systolic lower than in the original sitting position. Diastolic and systolic descending curves ran parallel. The higher the degree of hypertension immediately after lying down, the steeper the curve of the first stage of descent of the blood pressure. The drop after lying down is chiefly due to local regulation of tension in the central retinal artery and arteries in other parts of the body, especially in the territory of the splanchnic nerve; and to a certain degree to diminished cardiac activity in consequence of rest in bed. The pulse pressure of the retinal artery, and also the general blood pressure and pulse frequency generally show no clear alteration. C. Zimmermann.

Klein, Miklós. **Physics of diathermic coagulation in the eye.** Arch. of Ophth., 1937, v. 17, Jan., pp. 27-45.

The literature is reviewed and new apparatus for measuring the resistance in tissue under treatment by high-frequency energy is described. This consists of a high-frequency-measured current switch for separation of the two currents, the transformer and the instrument for supply and regulation of the measured current, and finally the highly sensitive tubal volt meter for measurement of the measured current and of the drop in potential in the tissue under treatment. As a result of experiments, it is found that the dose can be specified and adjusted on the basis of the milliammeter readings, providing the proper type and shape of electrodes are used. While the proper dosage is adjusted by electrical methods, the results are checked by ophthalmoscopy in order to obtain the desired effect. When using surface coagulation, the area must be kept moist, otherwise carbonization occurs, preventing coagulation from spreading into the deeper layer, but allowing sparking to develop which may be harmful to the eye. Experiments conducted with the pyrometric electrodes, to measure the variations in temperature and resistance, showed that the current needed to overcome the inertia of the points would cause exsiccation in a few seconds.

J. Hewitt Judd.

Marucci, Luigi. **Angiospasm of the retina.** Ann. di Ottal., 1936, v. 64, Oct., p. 671.

In a woman of 37 years the dominant characteristic was edema of the fundus, particularly in the region of the papilla, with paleness of the arteries. Complete recovery followed ovarian treatment. From the anamnesia, from the objective appearances, and from a critical review of the history, it was apparent that the retinal disturbances were dependent

upon imbalance of the endocrine and neurovegetative systems. The author discusses other instances of retinal angiospasm, and their bearing on the case here reported. (Bibliography.)

Park Lewis.

Wald, G. **Pigments of the retina.** Jour. of General Physiology, 1936, v. 19, May 20, p. 781, and v. 20, Sept. 20, p. 45.

The author conducted his experiments on the bull frog, sea robin, sea bass, and the scup. The combined pigment epithelium and choroid in these fishes contain vitamin A, flavine, and xanthophyll. Observations are reported on the distribution, properties, and concentration of the substances in the pigmented tissues of the eye.

Theodore M. Shapira.

Wilson, R. P. **Asteroid hyalitis (Benson's disease)** Giza Mem. Ophth. Lab., 10th annual report, 1935, p. 72.

The vitreous of the right eye of a 42-year-old male held suspended great numbers of small white starlike bodies. Under the slitlamp they appeared as tiny, light, cream-colored balls.

Lawrence G. Dunlap.

Wilson, R. P. **Familial cerebromacular degeneration.** Giza Mem. Ophth. Lab., 10th annual report, 1935, p. 73.

A case report of a girl aged fifteen years with poor vision since early childhood presenting a textbook picture of familial cerebromacular degeneration, vision O. D. 3/60, O. S. 1/60, central scotomata and poor fixation. The patient was physically underdeveloped but mentally normal. Her brother, fourteen years old, showed a moth-eaten appearance of the perimacular region.

Lawrence G. Dunlap.

11

OPTIC NERVE AND TOXIC AMBLYOPIAS

Ghose, A. K. **A case of cerebral malaria causing persistent loss of eyesight.** Indian Med. Gazette, 1936, v. 71, July, p. 403.

The author reports a case in which, in addition to the characteristic findings of malaria, there was reflex pupillary rigidity. This disappeared after administration of large doses of quinine. Vision was apparently not present. The author asks the question as to whether the visual loss was due to the cerebral malaria per se or to toxic amblyopia from the quinine. The author is evidently a general practitioner as intelligent description of the ocular findings and tests is lacking.

Theodore M. Shapira.

Lamb, H. D. **A case of tuberculous papillitis with anatomic findings.** Amer. Jour. Ophth., 1937, v. 20, April, pp. 390-395.

McKendree, C. A., and Doshay, L. J. **Visual disturbances, of obscure etiology, produced by focal intracranial lesions implicating the optic nerve.** Bull. Neur. Inst. of New York, 1936, v. 5, Aug., p. 223.

The authors describe six cases of visual defect due to proved intracranial expanding lesions. Three were due to aneurysms arising from the internal carotids or branches, and three were due to meningiomas arising from the edge of the optic foramen, the olfactory groove, and the sphenoid ridge.

Theodore M. Shapira.

Wilson, R. P. **Abscess of optic nerve.** Giza Mem. Ophth. Lab., 10th annual report, 1935, p. 52.

A 25-year-old man with right eye blind several years from iridocyclitis complained of pain and inflammation for the past two months. In the enucleated eye a small abscess was discovered in the nerve close behind the lamina cribrosa.

Lawrence G. Dunlap.

12

VISUAL TRACTS AND CENTERS

Franklin, C. R. **Visual studies in pituitary adenoma.** Bull. Neur. Inst. of New York, 1936, v. 5, Aug., p. 180.

The author presents an analysis of the visual findings in 28 cases of pituitary adenoma, all verified by pathologic studies of tissue removed at operation

or autopsy. The papillae showed changes in 25 cases. The appearance of the papillae was of great diagnostic importance, but seemed to be of little prognostic significance except in cases of advanced atrophy. All 28 cases showed some visual-field changes. The commonest type was bitemporal hemianopsia and it was present in 75 per cent of the cases. The duration of visual symptoms before operation seemed to bear a definite relation to the prognosis and to the degree of improvement manifested. While some improvement in vision is possible even in blind eyes, the degree of improvement taking place after operation is proportional to the visual acuity before operation.

Theodore M. Shapira.

Haden, H. C. **A study of the changes in the optic discs, visual fields, and vision following bisection of the optic chiasm.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 208.

A case is reported in which the optic chiasm was bisected to allow removal of a Rathke pouch tumor. Observations were made on the changes in the optic discs and visual fields in the course of a year. The rate of descending atrophy in the nerves is noted. Of especial interest are the observations on the effect of glandular medication on visual acuity, rapid and marked improvement being obtained upon administration of massive doses of whole pituitary.

David Harrington.

Johnson, T. H. **The significance of incomplete homonymous hemianopsia in brain tumor.** Bull. Neur. Inst. of New York, 1936, v. 5, Aug., p. 202. (See Amer. Jour. Ophth., 1936, v. 19, Sept., p. 823.)

Lutz, Anton. **Correction to the article of Horanzky on the geniculate body and the visual cortex in unilateral optic atrophy** (see Amer. Jour. Ophth., 1937, v. 20, March, p. 334). Klin. M. f. Augenh., 1937, v. 98, Jan., p. 79.

Lutz refers to his article in Annal. d'Ocul., 1923, v. 160, p. 265, as evidence that he and not Bárány was the first to assert that each visual field is separately represented in the visual cortex.

C. Zimmermann.

NEWS ITEMS

Edited by Dr. H. Rommel Hildreth
640 S. Kingshighway, St. Louis

News items should reach the Editor by the twelfth of the month

Miscellaneous

Miss Dorothy Park Lewis, who is the daughter of Dr. Park Lewis, is making the plans for the doctors who will attend the meeting at Cairo this winter. She is connected with Bellinger, Davis & Co., 509 Madison Ave., New York, and will be very glad to answer any questions which you may wish to ask concerning the itineraries, or plans for supplementary travel which you would like to carry out.

The twelfth intensive European summer courses in ophthalmology and otolaryngology, under the direction of George W. Mackenzie, M.D., will be given in Vienna, Austria, during the summer of 1937. All courses are given in the English language and are for graduates in Medicine only. The Mackenzie Group leaves New York, July 10th and returns September 4th. The cost of everything, including tourist-class accommodation on the steamship, second-class travel on the continent from port of debarkation to Vienna and return; board and lodging in Vienna; courses in Vienna and a daily sightseeing trip on the way back from Vienna to the ship will total $1,100.00, exclusive of boat tips. For one wishing to travel first-class on the boat, the total cost is $1,175.00.

The fifteenth annual summer graduate course in ophthalmology and otolaryngology of the Colorado Ophthalmological Society and Colorado Otolaryngological Society will be held in Denver, Colorado, July 26 to August 7, 1937.

In order to promote the convenience of those wishing to take but one branch of the work, the first week of the course will be devoted to Ophthalmology and the second to Otolaryngology.

The fee for the entire course is $50. Those taking either Ophthalmology or Otolaryngology only will be required to pay a fee of $30. Fees must be sent at the time of registration. Ninety percent of the fee will be returned to registrants who give notice of inability to attend, before the opening of the course. Checks should be drawn to the order of H. L. Whitaker, Treasurer, and mailed to him at 1234 Republic Building, Denver, Colorado.

Dr. Adolf Erdös of Vienna, Austria, has sent in the following News Letter:

The function of the international committee for the protection of eyesight and for the prevention of blindness

This organization which started activity five years ago succeeded in establishing branch committees in almost all parts of the world. All these branches act independently from the central bureau and their achievements are very valuable, particularly in Great Britain and France where they work in collaboration with eye hospitals and dispensaries and in the United States where the number of members reached the high figure of 25,000 and the yearly budget at the disposal of the organization rose to $140,000. In its five years of existence the international organization has chiefly dealt with erecting schools for children with reduced and impaired vision, with the prevention of industrial accidents, and with trachoma.

According to the latest report of the committee, the number of blind persons in the whole world is about six millions. In India alone there are one-and-one-half millions, in Great Britain 48,000, in Germany 34,000, in Poland 16,000 and in Hungary 5,800. From other countries there are no authentic data available. As for the causes of blindness, injuries, glaucoma, heredity, and infection play the greatest roles. The number of those blinded in the late World War is about 6,000 in Great Britain, 3,300 in Germany and 2,500 in France. It is one of the most important tasks of the International Committee to make due provisions that the unfortunates are rendered capable of working, to educate, to teach them, and to support them in their activities. The model educating school for the blind is still the one organized by Valentin Hauy in 1746.

At a recent meeting of the Vienna branch of the International Committee Dr. Fritsch quoted as examples of the performing abilities of blind people, in the first rank Milton, the famous English poet, writer of Paradise Lost, the mathematician Saunderson, the prominent artist Maria Theresia von Paradis, the politician Rodenbach, the minister of post Fawcett, and the deaf, dumb, and blind Laura Bridgman and Helen Keller. Blind men have played in literature a much greater role than their proportion to the nonblind population would suggest. If the states and society would bestow due care upon the blind, their fate would not be so desperate as it might otherwise be. State and social provision for the blind is exemplary in England.

Colored protective glasses

On the ground of thorough physiological examinations Professor Kuhl has established

the fact that greenish-gray (Hallauer) glasses and brownish-gray ones (Ultrasin) do not diminish visual acuity; on the contrary, they even increase it, whereas the blue and bluish-gray goggles decidedly do reduce visual acuity. The practical importance of this fact is that the automobile driver sees with a greenish-gray or brownish-gray glass just as well as without a protecting glass, and with blue glasses much worse. As regards the complete recognition of the colors, this is least disturbed by the brownish-gray glass. The rest of the colored glasses cause undesirable shadow-errors at the corresponding part of the color-scale.

Postgraduate courses for foreign graduates at the Budapest University

The lecturers and extraordinary professors of the Budapest University arrangel postgraduate courses on all subjects of the medical sciences, specially for foreign graduates. The language of the courses was German, French, and English. The courses lasted from April 30th to May 8th. Two lecturers, namely, Horvath and Licsko, lectured on ophthalmological subjects. The former's subject was: Newer diagnostic instruments and recent therapeutic methods. The latter lectured on, The use of the ophthalmoscope and on the surgery of the eye.

The hygiene of colors

The German Society for the Investigation of Light and Color has republished a series of charts for teaching what has been ascertained with regard to the hygiene of color, for the use of hospitals, sanatoriums, schools, and so on. White, it is stated, makes a room larger and lighter, but it appears cold and empty. A crimson hue imparts an air of delicacy. Children in a room with crimson-tinted walls, and light which passes through crimson shades, work eagerly and more than ordinarily. Yellow makes a room appear to be flooded with light, gives the feeling of sun warmth, and produces a feeling of comfort. Orange produces the warmest effect and disposes to cheerfulness. Orange-colored curtains in a bedroom have a stimulating influence on the nerves. Red best represents youthful joy, but is the hardest on the eyes. A pure natural red causes unrest; persons inclined to melancholia are put into a livelier frame of mind, but persons who are nervous should avoid red. Violet has a depressing effect, blue a calming and a soothing one. Patients sleep better with a night-light, if it is provided with a blue shade, than in the dark. Green has a calming influence. Gray, if it covers a wide area, is barren and dreary. Persons become depressed in such dingy rooms, and give evidence of lack of interest in their work. Patients are likely to be thrown into an unhappy frame of mind by dark and somber surroundings.

Societies

The Philadelphia County Medical Society Eye Section presented the following program on May 6, 1937: Dr. Joseph S. Lynch, Presentation of clinical cases from Temple University Eye Clinic; Dr. J. Milton Griscom, Pathology and diagnosis of retrobulbar neuritis; Dr. William E. Krewsen, 3d, Retrobulbar atropine injections for retrobulbar atrophy; Dr. I. S. Tassman, Newer forms of nonoperative treatment of cataract.

The following papers were presented at the meeting of the Association for Research in Ophthalmology, Inc., held in Atlantic City, June 8, 1937: 1. A laboratory study of some antiseptics with reference to ocular application, Richard Thompson, M.D., M. L. Isaacs, Ph.D., and Devorah Khorazo, M.D., Department of Ophthalmology, Columbia University, New York. 2. Contribution to the theory and practice of tonometry, Jonas S. Friedenwald, M.D., Wilmer Ophthalmological Institute of the Johns Hopkins University and Hospital, Baltimore. 3. A comparative study of experimental and clinical exophthalmos, George K. Smelzer, Ph.D., Institute of Ophthalmology, Columbia University, New York. 4. Return of vision and other observations in grafted vertebrate eyes, Leon S. Stone, Ph.D., Associate Professor of Anatomy, Yale University, New Haven. 5. Staphylococcic conjunctivitis (experimental reproduction with staphylococcus toxin), James H. Allen, M.D., University Hospitals, Iowa City, Iowa. 6. A preliminary report of a case of keratoconus treated with organotherapy, radium, and short-wave diathermy, H. L. Hilgartner, M.D., Henry L. Hilgartner, Jr., M.D., Joe Thorne Gilbert, M.D., Austin, Texas. 7. The effects of anoxemia on ocular movements while reading —with special reference to patients with motor anomalies, Ross A. McFarland, Ph.D., Charles A. Knehr, M.A., Conrad Berens, M.D., Department of Psychology, Columbia University, and Department of Research, N.Y. Eye and Ear Infirmary, New York. 8. The diagnosis and treatment of ocular tuberculosis by means of tuberculin, Merrill J. King, M.D., Howe Laboratory of Ophthalmology, Harvard University and Massachusetts Eye and Ear Infirmary, Boston. 9. Studies on galactose cataract, John C. Bellows, M.D., Lawrence Rosner, M.D., Northwestern University, Chicago. 10. The production and cure of ocular disturbances in adult albino rats by adjustment of vitamin A—Clinical implications, Arthur M. Yudkin, M.D., Aline U. Orten, Arthur H. Smith, New Haven, Connecticut.

Personals

Dr. Dewey Katz, formerly Assistant Professor of Ophthalmology of the University of Chicago announces the opening of his office at 99 Pratt Street, Hartford, Connecticut.